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Foreign and Domestic Firms: Long Run Employment Effects of Export Opportunities

Brian McCaig, Nina Pavcnik, and Woan Foong Wong

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**ABSTRACT**

We investigate a low-income country's long run employment response to new export opportunities. The U.S.–Vietnam Bilateral Trade Agreement reduced U.S. import tariffs on exports from Vietnam. Employment grew faster in the industries most exposed to the U.S. tariff reductions and this was driven by foreign affiliates of multinationals entering Vietnam. Foreign entrants continue to expand employment long after entry—even after 16 years. Most foreign entrants are exporters and from East Asia, highlighting that opportunities created by bilateral agreements are not just limited to signing parties. Vietnam's subsequent capacity growth allows it to export to other markets over time.

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A data appendix is available at <http://www.nber.org/data-appendix/w30729>

# 1 Introduction

Low-income countries have significantly increased their exports over the past three decades (Hanson, 2012, 2021). However, we know little about the long run employment effects of increasing exports in these countries. While exporting is expected to expand employment due to firm entry and growth, this is not guaranteed. The literature has in general documented limited employment growth of domestic firms in low-income country settings (Hsieh and Klenow, 2014; Hsieh and Olken, 2014; McMillan and Zeufack, 2022). On the other hand, the expansion of manufacturing exports from lower-income countries has taken place along with the development of global value chains, where production occurs in stages in multiple countries and is dominated by multinational enterprises (MNEs) and their affiliates in host countries (Johnson and Noguera, 2017). It is therefore also important to consider the responses of MNEs and their affiliates to new export opportunities.<sup>1</sup>

We investigate the long run effects of the 2001 U.S.–Vietnam Bilateral Trade Agreement (BTA) on employment in Vietnam. Our setting provides three unique characteristics that make it ideal to study the relationship between new export opportunities and employment. First, the main policy change in the agreement was a large and immediate reduction in tariffs on Vietnamese exports to the U.S., a major export destination—from 31.9% to 2.9% on average for manufacturing. Vietnam’s exports to the U.S. grew rapidly as the U.S. became an important market for Vietnam, accounting for over 15% of manufacturing exports (Figure 1).<sup>2</sup>

Second, the institutional features of the BTA allow us to address concerns about industry-specific trade policy changes being endogenous to FDI and other factors. The agreement lowered U.S. tariffs on Vietnamese exports by moving Vietnam from one pre-existing tariff schedule to another. Hence, neither U.S. nor Vietnamese industries had an opportunity to negotiate over industry-specific tariff reductions (McCaig, 2011). We show that Vietnamese manufacturing exports to the US grew faster in industries that received high tariff reductions, particularly in the

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<sup>1</sup>Low- and middle-income countries have received the majority of global foreign direct investment (FDI), investments made by MNEs, over recent decades (UNCTAD, 2014). Yet, the literature on the effects of MNEs on employment predominately focuses on high-income countries (Brainard, 1997; Yeaple, 2003; Hanson, Mataloni Jr and Slaughter, 2005; Desai, Foley and Hines, 2009; Muendler and Becker, 2010; Harrison and McMillan, 2011; Boehm, Flaaen and Pandalai-Nayar, 2020; Kovak, Oldenski and Sly, 2021). The literature on MNEs and labor markets in lower-income host countries concentrates on wage inequality among the employed, rather than jobs (Feenstra and Hanson, 1997; Javorcik, 2015; Alfaro-Urenña, Manelici and Vasquez, 2021).

<sup>2</sup>The majority of these manufacturing exports to the U.S. were final goods. For example, in 2004 93% were final goods. Additionally, while we focus on one country, Vietnam is a very relevant country in ongoing research on the reorganization of global value chains (Fajgelbaum et al., 2021; Alfaro and Chor, 2023).

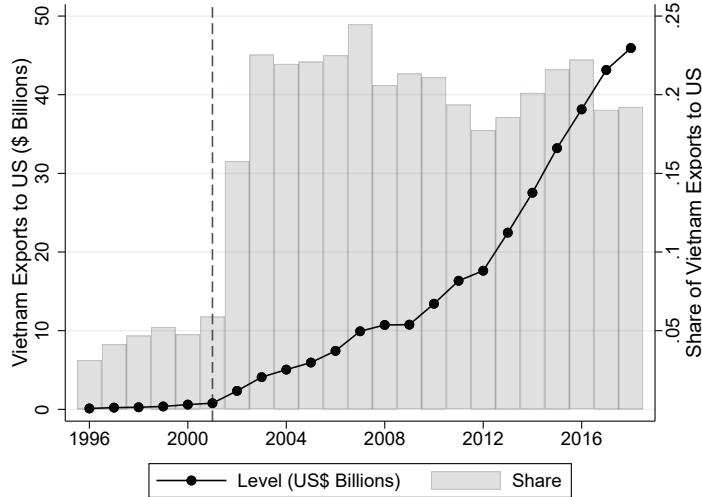


Figure 1: Vietnamese manufacturing exports to the US, 1996 to 2018

The dashed line indicates the year of the 2001 U.S.-Vietnam Bilateral Trade Agreement (BTA). Source: BACI, and authors' calculations.

first few years after the BTA, but not prior to the agreement. Importantly, we show that the variation in U.S. tariff reductions across industries is not correlated with the growth of Vietnamese industry exports to other large and high-income trade partners in the short-term aftermath of the agreement, nor prior to the agreement. These patterns are consistent with the plausibly exogenous nature of industry-specific tariff cuts in this context.

Third, the Vietnam Enterprise Survey data from 1999 to 2017 allows us to examine the effects of this one-time reduction in U.S. tariffs on employment over a long period, 16 years past the BTA's implementation in 2001. This length of a panel is rare in a low-income country setting. We combine the plausibly exogenous variation in the size of U.S. tariff reductions across industries with industry employment data from the surveys, which covers all registered (i.e., formal) firms, including foreign and domestic firms. This period features a dramatic expansion in Vietnam's formal manufacturing sector employment, from 1.4 to 6.9 million workers (Figure 2). This growth is particularly evident in foreign firms and has outpaced the growth of the working-age population.<sup>3</sup> Our empirical methodology compares how formal sector employment expands and evolves over time across industries, some facing larger tariff declines than others due to the BTA.

We find that Vietnamese industry employment grew more in industries with higher U.S. tariff

<sup>3</sup>Figure 2 shows an average annual growth rate of 9.8% between 2000 and 2017. In contrast, the working-age population grew by 1.6% annually, from 38.6 to 52.8 million. This rapid expansion in formal manufacturing employment aligns with trends of shrinking agriculture, growing manufacturing, and a shift from informal to formal firms (McCaig and Pavcnik, 2017, 2015, 2018; Asghar and McCaig, 2024).

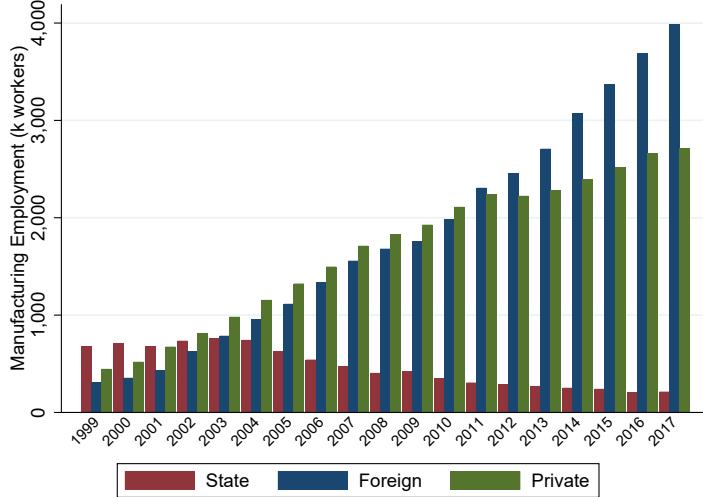


Figure 2: Vietnamese manufacturing employment by ownership, 1999 to 2017

Foreign firms are foreign-owned enterprises, state firms are state-owned enterprises (SOEs), and private firms are domestic companies that are not state-owned or foreign-owned. Source: Vietnam GSO and authors' calculations.

reductions throughout the 16-year period, with an industry exposed to the average tariff reduction having doubled in employment relative to an industry that was not exposed. These employment increases take time to accumulate: our year six estimate accounts for 61 percent of the cumulative response 16 years after the agreement. The panel enables us to decompose changes in employment within industries that occur through firm entry, exit, and changes in continuing firms. We find that tariff-induced employment growth is largely due to entry of foreign firms—these are new firms and jobs in formal manufacturing, not acquisitions of existing firms. Importantly, we show that the long run tariff-induced employment shift to foreign entrants is due to both initial entry and subsequent employment growth after entry. We find that the vast majority of the tariff-cut induced increase in employment in foreign entrants reflects employment growth in exporting foreign affiliates and that the foreign entrants came predominantly from East Asian countries, not the US. Lastly, we find that the long run employment effects (after 2010) from a U.S. trade policy, are also associated with long run expansion of Vietnamese exports to non-U.S. markets.

**Our study makes several contributions to the literature.** Data limitations and tariff change endogeneity have made it difficult to study the long-term impact of exporting opportunities in low-income countries. Our unique setting allows us to directly examine how trade policy, via exporting, expands employment and fosters the development of the formal manufacturing sector over a long period. One key new insight is that this trade-induced employment expansion

occurs gradually and predominately through entry of foreign affiliates that export, an important distinction given the evidence on lackluster growth of domestic firms in low-income settings (Hsieh and Klenow, 2014; McMillan and Zeufack, 2022). Below we place our contributions to the literature in greater detail.

First, our finding that the effects of lower tariff on exports on employment gradually accumulate over time and exceed the shorter-term ones reflect different dynamics than the recent literature on the **long run employment effects** of import competition.<sup>4</sup> There, import tariff cuts reduce employment in the short run and this reduction builds over time as firms (and industries) slowly contract and exit (Dix-Carneiro and Kovak, 2017).<sup>5</sup> In our case of lower tariffs on exports, we observe a relatively quick increase in employment due an immediate entry of foreign firms to industries that experience larger tariff cuts, with more gradual increases in employment growth in these firms subsequent to entry.<sup>6</sup> Overall, the tariff reductions were important for initially increasing employment by attracting foreign firms to Vietnam, but half of the tariff-induced cumulative employment growth over 16 years was due to gradual post-entry employment growth in these firms.<sup>7</sup>

Second, we contribute to literature on the **impact of trade policy on multinationals**, an area with limited evidence as suggested by a recent survey (Antras and Chor, 2022). This literature has mainly focused on tariff-jumping motives for foreign direct investment (Brainard, 1997; Feinberg and Keane, 2006, 2009), the impact of tariffs on sourcing of intermediates products (Yi, 2003; Yeaple, 2003; Hanson, Mataloni Jr and Slaughter, 2005; Conconi et al., 2018; Handley, Kamal and Monarch, 2020; Flaaen and Pierce, 2019; Antràs et al., 2022), and only recently on

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<sup>4</sup>See Dix-Carneiro and Kovak (2017) for evidence from domestic import trade liberalization in Brazil and Autor et al. (2014), Utar (2018), Autor, Dorn and Hanson (2021), Kovak and Morrow (2022), and Pierce, Schott and Tello-Trillo (2022) for evidence from high-income countries.

<sup>5</sup>This long run response to import tariff cuts is driven by an immediate decline in firm entry, a prolonged contraction of surviving firms, and a slow increase in firm exit due to slow adjustment of capital and lack of out-migration of workers from regions hard-hit by import competition.

<sup>6</sup>McCaig and Pavcnik (2018) find that lower tariffs on Vietnamese exports due to the BTA lead to reallocation of workers from the informal to the formal sector in the very short aftermath of the BTA. We examine long-term effects of this same trade policy change on firms in the formal sector, including foreign affiliates, to better understand the sources of trade-policy induced growth in formal manufacturing employment. McCaig (2011) and Fukase (2013) also study the short run effects of the BTA on poverty and wages respectively. Mitra, Pham and Ural Marchand (2022) report increased upward occupational mobility in Vietnam due to the U.S. tariff reductions while Hoang, Mitra and Pham (2023) find a reduction in labor market distortions in Vietnam's formal manufacturing sector due to U.S. tariff reductions. Erten and Leight (2021) shows that economic activity in China moved out of agriculture into manufacturing and services in response to a reduction in export tariff uncertainty.

<sup>7</sup>In contrast, private domestic entrants show much smaller growth after entry in response to tariff declines in export destination, consistent with a general lack of employment growth in low-income country settings (Hsieh and Klenow, 2014).

export-oriented multinational production (Tintelnot, 2017; Garetto et al., 2024; Antràs et al., 2022).<sup>8</sup> While the existing literature examines trade policy and export-oriented multinational production in the context of quantitative trade models and calibration based on one high-income country as a source of FDI, we provide new empirical insights for a low-income host country—a scenario increasingly relevant in practice. Importantly, we focus on one production location that experiences a large tariff decline to a large destination market, and we can observe affiliates from all source countries. Our novel empirical setting highlights the importance of foreign affiliate entry in response to trade policy over the expansion of existing firms, which has been the primary focus of quantitative literature (with exception of Garetto et al. (2024)).<sup>9</sup> Over time, Vietnam’s capacity growth allows it to export to other markets as well. We provide empirical evidence on the effects of trade policy in this setting, while addressing concerns about the endogeneity of trade policy to FDI (as emphasized in Blanchard (2007); Blanchard and Matschke (2015); Blanchard, Bown and Johnson (2021)). Second, our finding that the tariff-induced foreign entrants are affiliates of non-U.S. multinationals (mainly from East Asia) rather than affiliates of U.S. multinationals, illustrates that the geography of global value chains plays an important role (Head and Mayer, 2019; Antràs et al., 2022) and that the opportunities created by changes in bilateral trade policy are not limited to the directly affected countries. Importantly, they point to additional political economy considerations for trade agreements, stemming from firms and/or industries from non-signatory countries.

Finally, we contribute to the literature on **MNEs and employment**, which has almost entirely focused on high-income countries.<sup>10</sup> In a lower-income setting, generating jobs in the formal sector is an important feature of economic development (Bandiera et al., 2022). Jobs in the formal sector in Vietnam pay higher wages, are more likely to offer social security benefits, and workers in the formal sector are less likely to hold multiple jobs (McCaig and Pavcnik, 2018). Banerjee and Duflo (2008) argue that these features are key differences between the poor and middle class in

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<sup>8</sup>Earlier literature examines the effects of trade agreements on FDI at the aggregate country-pair level (Bergstrand and Egger, 2007; Egger and Wamser, 2013; Blonigen et al., 2007; Ekholm, Forslid and Markusen, 2007).

<sup>9</sup>Tintelnot (2017) focuses on adjustments among incumbents. Likewise, Head and Mayer (2019) focus on choices among existing affiliates of automobile producers. Our results on prolonged entry of affiliates are consistent with sunk costs of affiliate establishment (Garetto et al., 2024).

<sup>10</sup>The literature on lower-income countries predominately focuses on wage inequality among the employed (Feenstra and Hanson, 1997; Javorcik, 2015; Alfaro-Ureña, Manelici and Vasquez, 2021). Relatedly, there is a large literature examining productivity spillovers from foreign to domestic firms in low- and middle-income countries (Harrison and Rodríguez-Clare, 2010; Poole, 2013; Kee, 2015; Newman et al., 2015; Abebe, McMillan and Serafinelli, 2022; Alfaro-Ureña, Manelici and Vasquez, 2022).

developing countries. Toews and Vézina (2022) finds job creation through the arrival of foreign firms driven by natural resource discoveries. This is in contrast to concerns of foreign firms being capital intensive and thus not generating many jobs (see Diao et al. (2021) and Athukorala and Tien (2012) for such concerns in Sub-Saharan Africa and Vietnam in the 1990s respectively). We show that lower tariffs on exports in part generate growth in formal manufacturing employment through increased entry of foreign firms (Figure 2). Over the 16 years after the BTA, foreign entrants expanded their share of employment by 19 percentage points in a Vietnamese industry experiencing the average tariff reduction relative to an industry with no reduction. This provides new evidence on the importance of MNEs for formal sector job creation in a lower-income host, driven by trade policy in a key export market.

We provide a detailed discussion of the BTA and a conceptual framework in section 2. In section 3, we describe the data and highlight some key facts. We present the empirical methodology and results in sections 4 through 6. Section 7 concludes.

## 2 Institutional and Conceptual Background

We first present background on the BTA and foreign investment in Vietnam. We conclude with a conceptual framework.

### 2.1 2001 U.S.-Vietnam Bilateral Trade Agreement

The United States and Vietnam began negotiations for a bilateral trade agreement after the normalization of diplomatic relations in 1995. The agreement was a necessary step for the U.S. to be able to offer Most Favored Nations (MFN) tariffs to Vietnam (Manyin, 2001). The BTA was signed on July 13, 2000 and implemented on December 10, 2001. The nature of the BTA makes it an excellent setting to study the causal impacts of U.S. tariffs reductions on Vietnamese formal firm entry and employment.

First, the BTA's main trade policy change was an immediate one-time reduction in tariffs imposed on Vietnamese exports to the U.S. (STAR-Vietnam, 2003; McCaig, 2011). Prior to the BTA, Vietnam already offered MFN tariffs on imports from the U.S.<sup>11</sup> However, Vietnamese

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<sup>11</sup>The BTA-induced reductions in Vietnamese tariffs on imports from the U.S. were therefore negligible. Vietnam's requirements included customs reform to conform to WTO standards, service trade liberalization, strengthened intellectual property rights enforcement, protection of foreign direct investment, and increased transparency

exports were subject to the high Column 2 U.S. tariffs, which apply to countries without normal trade relations status with the U.S. The primary trade policy element was to reclassify Vietnamese exports from Column 2 to the MFN tariff schedule, which went into immediate effect in December 2001. The U.S. tariff reductions are therefore less likely to suffer from concerns about being endogenous to industry lobbying, either in the U.S. or Vietnam, as they occurred through the movement from one pre-existing tariff schedule, Column 2, to another pre-existing tariff schedule, MFN.<sup>12</sup> Thus, for industry lobbying to influence the size of the tariff reductions would require changes to the Column 2 or MFN tariff schedule, but both tariff schedules were very stable before and after the BTA (McCaig, 2011). Hence, the tariff cuts were presented as one package without room for negotiating over tariff reductions for specific industries.

A second key feature of the BTA is that the tariff reductions within manufacturing were large, on average, and varied across industries (Figure 3). We use ad valorem equivalents of the Column 2 and MFN tariff rates that prevailed in 2001 when the BTA was implemented.<sup>13</sup> Across 119 4-digit traded manufacturing industries, the average tariff reduction was 29.0 percentage points, from 31.9% to 2.9%, with significant variation across industries, ranging from 0 to 63 percentage points.<sup>14</sup> The standard deviation of industry tariff reductions is 15.6 percentage points. Our empirical strategy relies on this variation in tariff reductions across industries.

Third, we rule out spurious correlation of the U.S. tariff reductions with industry-specific pre-BTA characteristics. For example, there is no relationship between the size of U.S. tariff cuts and industry employment prior to the BTA (Table C1).<sup>15</sup> More generally, we show that the U.S. tariff reductions are not correlated with initial industry conditions (share of industry employment in foreign firms (and state, private domestic), capital per worker, wages per worker, and revenue per worker) within formal manufacturing at the 4-digit industry level (Table C1).

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for laws and regulations (STAR-Vietnam, 2003).

<sup>12</sup>The Column 2 tariff schedule originated with the Tariff Act of 1930 (Pregelj, 2005). The MFN tariff schedule was negotiated among World Trade Organization members in 1995.

<sup>13</sup>We follow McCaig (2011) and use detailed information on U.S. tariffs for both of these tariff schedules from the U.S. International Trade Commission's online Tariff Information Center (USITC) and compute the ad valorem equivalent of any specific tariffs. We then match the tariff lines to industries by the concordance provided by the World Bank via the World Integrated Trade Solution database (WITS) to construct industry-level tariffs according to 4-digit International Standard Industrial Classification (ISIC) industry nomenclature.

<sup>14</sup>The mean tariff reduction was 0.276, 0.262, and 0.281 for final, intermediate, and capital goods respectively. These findings show that while Vietnam primarily exports final goods to the U.S., the tariff reductions are not differentially lower for final goods.

<sup>15</sup>For visualization purposes only, Figure B1 reports average tariff cuts across 2-digit industries, sorted by their pre-BTA employment size in 2000. There is no systematic relationship between tariff cuts and initial industry employment. A similar results hold for the relationship between the U.S. tariff reductions and industry employment in 2000 in foreign and domestic firms (Figure B2).

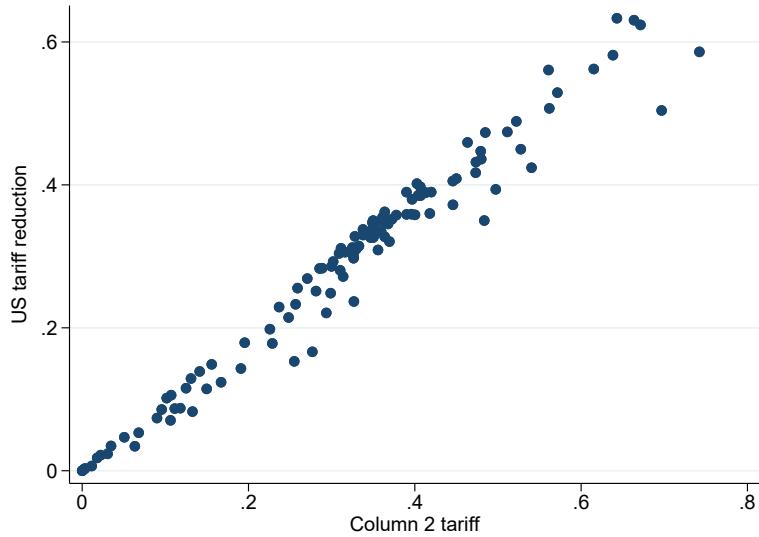


Figure 3: U.S. tariff reductions due to the BTA

*Note:* Each point represents a 4-digit ISIC revision 3 industry within manufacturing. The Column 2 tariffs are weighted averages of ad valorem equivalent 10-digit HTS tariffs as of 2001. The reduction is calculated as the Column 2 tariff minus the MFN tariff in the industry in 2001, where the MFN tariffs are weighted averages of ad valorem equivalent 10-digit HTS tariffs as of 2001. Source: USITC, World Bank WITS, and authors' calculations.

Fourth, the U.S. tariff reductions had a large immediate impact on Vietnamese exports to the U.S. The U.S. quickly became the most important manufacturing export market, accounting for 24% of Vietnamese manufacturing exports by 2003, becoming the leading export market in 2005 for the rest of the sample period (see detailed discussion in Appendix B.2 and Figure B3).<sup>16</sup> In Section 4.2, we examine in detail the short and long run responses of Vietnamese exports to the U.S. (and Vietnamese exports to other key export markets) to these tariff cuts. That analysis further confirms lack of spurious correlation. The U.S. tariff cuts are only associated with increased exports to the U.S. –but not exports to other key markets –in the immediate aftermath of the agreement, nor are they correlated with pre-BTA exports to the U.S. or exports to other key destinations. We also confirm that export responses to tariffs do not mainly reflect demand or supply conditions in initially larger exporting industries.

<sup>16</sup>Upon implementation of the BTA, Vietnamese exports of apparel and textiles did not face any import quotas to the U.S. as Vietnam was not subject to the Multi-Fibre Agreement due to being outside of GATT and WTO. In July 2003 a bilateral textile agreement came into force, which imposed quotas on Vietnamese textile and apparel exports to the U.S. The quotas were removed in 2007. In robustness checks we show our main results are not sensitive to the exclusion of textile or apparel industries nor the inclusion or exclusion of controls for quotas.

## 2.2 WTO Accession

The BTA was seen as a precursor to Vietnam joining the World Trade Organization (WTO), which it did on 11 January 2007. Recall that the main trade policy change in the BTA is lower variable costs of accessing an export market. Thus, Vietnam's WTO accession could in principle influence our results if it reduced tariffs in Vietnam's export markets. However, Vietnam's WTO accession led to no broad-based changes in its foreign market access as its major export markets already offered it MFN status (e.g., the U.S. due to the BTA) or better (MFN plus Generalized System of Preferences access in the case of the European Union (E.U.) and Japan, as well as preferential access to China through the ASEAN-China Free Trade Agreement).<sup>17</sup> An important exception is textiles and clothing. WTO negotiations with the E.U. led to the removal of E.U. import quotas on textiles and clothing from Vietnam in January 2005 and WTO accession led to the removal of similar U.S. import quotas in January 2007. In our analysis, we confirm that our results are quantitatively similar when we exclude textiles and clothing.

Vietnam already offered MFN import tariffs to the U.S. prior to the BTA. The additional MFN import tariff reductions due to its WTO accession are not correlated with the BTA-induced U.S. tariff reductions (Figure B14).<sup>18</sup> Nonetheless, we control for the WTO-induced industry-level changes in Vietnam's MFN tariffs between 2007 and 2013 in our empirical estimations.

## 2.3 Foreign investment policy

Prior to the BTA, Vietnam was relatively open to FDI in manufacturing as there were very few manufacturing industries with entry restrictions for foreign investment (tobacco, sugar and alcohol, chemicals, pharmaceuticals, and cement) (Malesky, Gueorguiev and Jensen, 2015). Moreover, foreign investors had relative freedom over the mode of operation—100% fully foreign-owned versus a joint venture. On the eve of the BTA, 77% of employment in foreign firms was in firms that were 100% foreign-owned. These 100% foreign-owned firms made up 67% of all foreign firms, highlighting the relative openness of Vietnam to manufacturing FDI prior to the BTA.

The BTA included no industry-specific commitments to FDI within manufacturing in Vietnam, but it required Vietnam to eliminate government screening of FDI and remove all trade-related investment measures inconsistent with the WTO (Manyin, 2001). The 2006 Unified Investment

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<sup>17</sup>See section B.4 for further details on trade policy with Vietnam's other major export markets.

<sup>18</sup>See section B.4 for further details on other instances of domestic trade liberalization during this period.

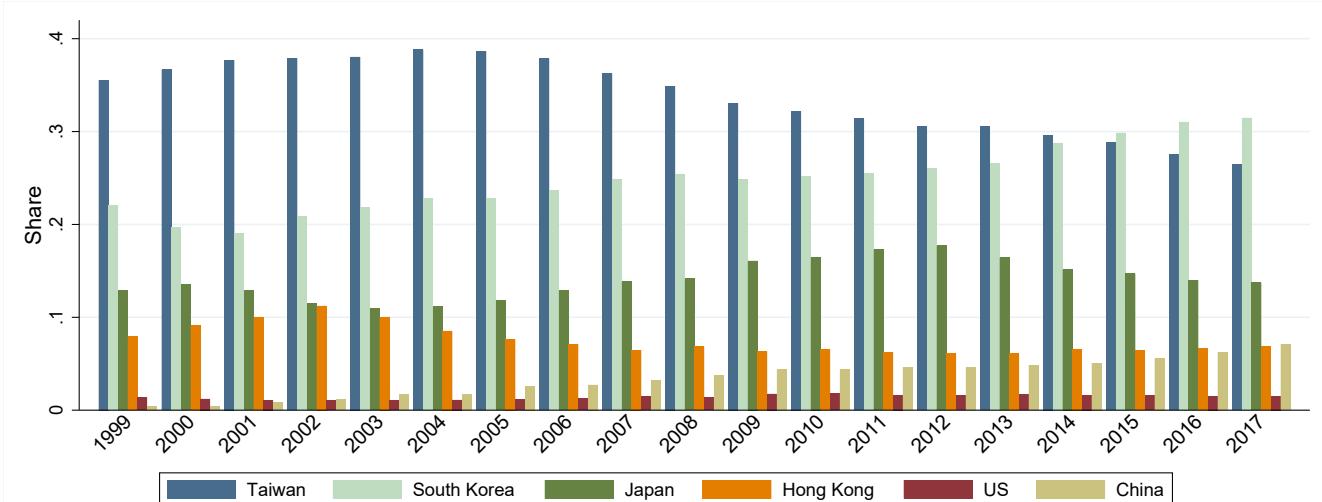


Figure 4: Share of foreign-invested employment by source country

*Note:* Each bar is the ratio of manufacturing employment in foreign-invested firms from the indicated country relative to total manufacturing employment in foreign-invested firms in the indicated year. Source: Vietnam GSO and authors' calculations.

Law abolished local content and export target requirements and provided foreign investors complete freedom in terms of entry mode (joint venture or 100% foreign-owned) (Athukorala and Tien, 2012). None of these changes were industry-specific. By 2017, 95% of manufacturing employment in foreign firms was in 100% foreign-owned firms.

Finally, the U.S. is a very minor source of manufacturing FDI in Vietnam before and after the BTA. Figure 4 reports the share of FDI employment by source country from 1999 to 2017.<sup>19</sup> Most foreign investment in manufacturing stems from East Asian economies, making up more than 80% of foreign employment (82% in 1999 and 90% in 2017). In 1999, the most common sources of funding are Taiwan (36%), South Korea (22%), and Japan (13%). The U.S. accounted for less than 2% throughout. China started as a small source country in 1999, at 0.004%, but grew to 7% by 2017.

## 2.4 Conceptual Framework

Previous sections showed that the primary trade policy change due to the BTA was a reduction in tariffs on Vietnamese exports to a large destination market and these tariff cuts were particularly large in manufacturing. This presents an excellent setting to examine the employment response to tariff cuts in the nascent formal manufacturing sector of a low-income country, including the

<sup>19</sup>The annual enterprise surveys, which we use for the analysis, contain information on funding by source country.

role of affiliates of foreign MNEs.

Conventional trade theory suggests that Vietnamese industries that experienced larger U.S. tariff reductions should expand relative to industries with smaller tariff reductions. In addition, these tariff reductions could differentially affect the performance and survival of existing firms as well as the entry decision of new firms within an industry. We start our discussion in a setting with one dimension of firm heterogeneity, productivity, and extend it to additional potential advantages of affiliates of foreign MNEs.

In a typical Melitz framework (Melitz, 2003; Mrázová and Neary, 2019), firms differ in their productivity or marginal costs within an industry and face fixed costs of exporting. A reduction in the variable costs of accessing export markets, such as a reduction in tariffs, is predicted to lead to expansion of the most productive continuing firms and contraction and/or exit of less productive firms due to selection and reallocation. In our setting, two additional issues need to be considered. First, lower tariffs in accessing a large export destination provide an impetus for multinationals to adjust their participation in Vietnam. Second, the response to lower trade costs is likely to vary by firm ownership—foreign firms might be better positioned to respond relative to domestic firms, and domestic state firms might have better political connections relative to private firms.

**Entry and expansion of multinational affiliates** Recent studies theoretically and quantitatively examine a broad set of foreign affiliate entry determinants (Garetto et al., 2024). Multinationals tend to have higher productivity than domestic firms and are therefore better positioned to serve foreign markets through an affiliate (Helpman, Melitz and Yeaple, 2004) or establish new affiliates in host countries to primarily serve third-country export markets (Tintelnot, 2017; Garetto et al., 2024).<sup>20</sup> The literature on factors contributing to foreign affiliate establishment emphasizes variable trade costs (including trade policy), variable production costs (including wages and the costs of intermediate inputs), and additional fixed costs of setting up a new production facility (Antràs and Yeaple, 2014; Antràs and Chor, 2022). Garetto et al. (2024) distinguish between sunk costs of establishing an affiliate versus fixed cost of operations. How might lower tariffs in an export destination then affect affiliates of MNEs in our setting? While Vietnam was already

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<sup>20</sup>Although it is difficult to measure productivity in this setting, data suggest that foreign affiliates are on average more productive than state and private firms. Foreign firms are much more likely to be engaged in exporting than either state or private firms in Vietnam. In 2000, 72% of foreign firms reported positive exports as compared to 32% of state and 16% of private firms (Figure B5). Combined with exporters typically being larger, around 90% of workers in foreign firms work in exporting firms, as compared to around 60% for state and less than that for private (Figure B6).

open to manufacturing FDI prior to the BTA and had relatively low wages, tariffs on its exports to the U.S. were very high. With high tariffs on Vietnamese exports to a large export destination, the variable profits from exporting might not be high enough to cover the the fixed costs of setting up an affiliate in Vietnam prior to the BTA. Once tariffs on Vietnamese exports to the U.S. are drastically reduced, the variable profits from exporting to the U.S. and other countries might make it more likely for the multinational to cover fixed costs of setting up an affiliate in Vietnam, leading to foreign affiliate entry.

Furthermore, multinationals and their foreign affiliates might also differ from domestic firms in dimensions other than productivity. They tend to have access to foreign technology, “special assets” that cannot be easily transferred to unaffiliated firms, and connections to global value chains relative to domestic firms (Antràs and Yeaple, 2014).<sup>21</sup><sup>22</sup> Foreign firms might also face fewer frictions than domestic firms.<sup>23</sup> These characteristics may further enable foreign firms to expand relative to domestic firms in Vietnam through new entry and expansion of incumbents in response to BTA-induced tariff cuts. Note that the above mechanism does not require foreign firms to directly compete with domestic firms in the domestic product market. Even if foreign firms are mostly targeting export markets, their tariff-cut induced expansion can increase local labor demand and influence the labor costs for domestic market-oriented firms.<sup>24</sup> Finally, while our focus is primarily on the differential role of foreign firms, many countries, including Vietnam, feature a prominent state-owned sector in manufacturing, which may be associated with entry barriers or preferential access to inputs (Mishra, 2011; Khandelwal, Schott and Wei, 2013; Malesky,

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<sup>21</sup>See Antràs and Yeaple (2014), which references Hymer (1960) and Helpman (1984) with regards to multinational “ownership of special assets that confer a strategic advantage over indigenous firms in foreign markets...and the need for a direct involvement of the asset owner,” as well as the tangible and intangibles assets of multinational firms.

<sup>22</sup>Foreign exporters operating in Vietnam import a greater percentage of their inputs than private domestic exporters, 67 vs 34%, and purchase a greater percentage of their inputs from foreign firms operating in Vietnam, 14 vs 4%, suggesting they are connected to global value chains in ways that domestic firms are not.

<sup>23</sup>Trade-related frictions in lower-income countries include credit and financing (Manova, 2013; Paravisini et al., 2015), contracting frictions (Macchiavello, 2022), information on export markets (Bernard and Moxnes, 2018; Alessandria, Arkolakis and Ruhl, 2021), politically connected firms (Khandelwal, Schott and Wei, 2013; Brandt et al., 2017; Baccini, Impullitti and Malesky, 2019), production knowledge (Atkin, Khandelwal and Osman, 2017), and language constraints in the context of global value chains (Guillouet et al., 2024), among others. See (Hsieh and Klenow, 2014; Hsieh and Olken, 2014; McMillan and Zeufack, 2022) for evidence on limited employment growth among domestic firms in lower-income countries.

<sup>24</sup>McCaig (2011) and Fukase (2013) find that the U.S. tariff cuts increased wages for unskilled workers in provinces more exposed to the reductions compared to those less exposed. McCaig and Pavcnik (2018) find BTA-induced within industry reallocation of workers from informal microenterprises to registered firms. Asghar and McCaig (2024) report increased earnings for workers switching into jobs in formal manufacturing in the most exposed industries.

Gueorguiev and Jensen, 2015).<sup>25</sup> Such preferential treatment might keep politically-connected firms protected from new entrants, or subsidize and artificially lower their operating costs.

Our discussion highlights two main ideas, beyond the prediction that the tariff reductions in a large export market are expected to contribute to expansion of employment in the nascent formal manufacturing sector in Vietnam. First, there should be tariff-induced changes in the composition of employment across firms within an industry due to entry, exit, and adjustments of continuers. Second, the extent of entry, exit, and reallocation within industries in response to tariff cuts is likely to differ for foreign affiliates because they are potentially better positioned to respond to tariff cuts than domestic firms. How each of the firm margins of adjustment contributes to tariff-induced changes in employment is ultimately an empirical question, which we turn to next.

### 3 Data

**Firm-level Data** We use data from the annual enterprise survey conducted by the General Statistics Office (GSO) of Vietnam, covering the years 2000—the first year of the survey—through 2017.<sup>26</sup> This survey covers all businesses in Vietnam registered as an enterprise according to the Enterprise Law. All state, collective, and foreign businesses must register as an enterprise to legally operate in Vietnam. A private business is legally required to register as an enterprise if it has more than 10 workers or operates in more than one location. However, many private businesses with less than 10 workers are registered.<sup>27</sup> The data covers a long period, over which the formal manufacturing sector expanded dramatically.

The data contain information on the industry of operation at the 4-digit International Standard Industrial Classification (ISIC) level, employment, revenue, and fixed assets of the firms, and for some years whether and how much a firm exports. The surveys contain a number of key variables and features that we use in our analysis. First, we can consistently categorize firms by ownership as state, foreign, and private. We define a foreign firm as including 100% foreign owned as well as all joint ventures between a foreign and Vietnamese firm. We define state as 100% state-owned as well as domestic firms in which the state owns more than 50% and we define private as 100%

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<sup>25</sup>In Appendix B.5, we discuss the Vietnamese government’s policy on state-owned firms.

<sup>26</sup>We stop in 2017 to avoid possible spillover effects from the U.S.-China trade war.

<sup>27</sup>See law No. 13-1999-QH10. The employment threshold for required registration changed over time. Prior to 2004, there was no employment size threshold (see Decree No. 02/2000/NĐ-CP) with the threshold specified as 10 or more workers from 2004 onward (see decree No. 109/2004/NĐ-CP). Unregistered (i.e. informal) firms have on average 1.6 workers (including the owner), well below this threshold (McCaig and Pavcnik, 2021).

domestic privately-owned firms as well as domestic firms in which the private owners own 50% or more. Our analysis relies on the initial firm ownership.<sup>28</sup> Second, the data for foreign affiliates includes information on the source country of capital, allowing us to measure the main source countries of FDI over time and to examine the responses of foreign affiliates to trade policy across all source countries. Third, an important contribution of our study is the improvements of the data, especially tracking of firms over time.<sup>29</sup> The unique firm identifier allows us to track firms over time. This enables us to examine firm exit and entry, as well as changes in performance among continuing firms. Annually, an exiting firm is defined as a firm that operated in  $t$ , but not in  $t + 1$ . An entering firm is defined as a firm that operated in  $t + 1$ , but did not operate in  $t$ . A continuing firm is a firm that operated in  $t$  and  $t + 1$ . We focus on firms in traded manufacturing industries, as indicated by the main industry of operation at a 4-digit ISIC level.<sup>30</sup> In our analysis, we use the industry reported by the firm in its first year in the dataset. Relatively few firms report operating in multiple industries.<sup>31</sup> We link firms to tariffs across 116 4-digit manufacturing industries. See Table B1 in Appendix B.1 for further details on the importance of entry and exit in the formal manufacturing sector, overall, and for foreign, state, and private firms. In the data appendix, Appendix A, we provide additional detail on the sampling framework and preparation of the data for analysis.

Firm data is available from 2000 (1999 for employment).<sup>32</sup> We further use 2-digit industry data from 1995 to 2004 to examine the potential correlation of BTA-induced tariff cuts with pre-existing trends and the consistency of results using this more aggregate data in the post-BTA period. This 2-digit data comes from various statistical yearbooks and tables from the 1998 Industrial Census

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<sup>28</sup>Changes in firm ownership mainly occur for state firms due to privatization. Figure C7 replicates Figure 2 using initial rather than contemporary ownership. It yields a smaller decrease in state employment and a smaller increase in private domestic employment owing to state privatization. We perform robustness checks of key results with contemporary ownership definition.

<sup>29</sup>See section A.4 for detailed discussion of verifying the tracking of enterprises over time. This is particularly important from 2000 to 2001 and among state-owned firms.

<sup>30</sup>The 2000 through 2010 data provide industry codes according to the 1993 Vietnam Standard Industrial Classification (VSIC) while the 2007 through 2017 data provide industry codes according to the 2007 Vietnam Standard Industrial Classification. We use the overlapping years to create a concordance and perform all analysis using the 1993 VSIC codes, which are identical to ISIC revision 3 within traded manufacturing.

<sup>31</sup>Our data allows firms to report multiple industries, but the percentage doing so is relatively low: 6% for foreign firms and 8% for private firms across all years. Since employment in secondary industries tends to be small within firms, this accounts for only 0.5% of foreign employment and 2.4% of private employment in 2010.

<sup>32</sup>We observe both the start and end of year employment, and use the end of year information to capture a firm's employment in that year. We use start of year employment in 2000 as a proxy for end of year employment in 1999. This allows us to extend our employment analysis one additional year prior to the BTA for specification checks. In years when the two employment estimates are both available, end of year employment in year  $t - 1$  and start of year employment in year  $t$  are very strongly positively correlated across industries and time.

Table 1: Summary Statistics, Years 2000 and 2017

	Foreign	Private	State	Total
2000				
Employment	342 (1,033)	67.1 (249)	461 (754)	153 (511)
Number of Firms	1,019	7,596	1,497	10,112
2017				
Employment	515 (1,986)	32 (270)	389 (881)	84.6 (693)
Number of Firms	7,616	69,817	1,307	78,740

*Note:* The table reports mean employment by firm with standard deviations reported in parenthesis. Each observation is a firm.

Source: Vietnam GSO and authors' calculations.

produced by the GSO (see Section C.1 for more details).

Table 1 presents summary statistics overall and by firm ownership for years 2000 and 2017. The data includes over 750,000 firm-year observations (over 150,000 unique firms), with the number of firms growing from over 10,100 in 2000 to over 78,000 in 2017. In 2000, foreign and state firms on average employ more people compared to private firms although there are many more private firms. The overall number of firms grows primarily due to an increase in private firms, but the number of foreign firms increased by more than seven-fold from about 1,000 to 7,600, while the number of state firms contracts.<sup>33</sup>

**Trade Data** We use international trade data from UN Comtrade and BACI (Gaulier and Zignago, 2010) covering 23 years from 1996 to 2018, including 5 years prior to the BTA.<sup>34</sup> In addition to using Vietnamese exports to the world, we also rely on Vietnamese exports to key markets including the U.S., the E.U., and East Asian partners (South Korea, Japan, China, and Hong Kong). These trading partners make up the majority of Vietnam's manufacturing exports - 62% in 2000 and 69% by 2017 (see Appendix B.2 and Figure B3a).

<sup>33</sup>Since our data tracks firms as ownership changes and we are basing our analysis on initial ownership, the rapid expansion of the number of foreign firms in Table 1 is due entirely to new entry rather than acquisitions. Additionally, it appears that most new foreign enterprises are the first affiliate in Vietnam for the parent MNE. We can match about half of foreign enterprises from the annual enterprise survey operating in 2017 to data in Orbis. Among those that were matched, the vast majority have a unique global ultimate owner, suggesting they are the only affiliate of the owner operating in Vietnam.

<sup>34</sup>This data is at the 3-digit ISIC revision 3 code. While we focus our trade analysis at the 3-digit industry level because many 4-digit industries report no trade before the BTA, we also examine our results at the 4- and 2-digit levels. For UN Comtrade, we use imports from Vietnam reported by its major trading partners.

## 4 Exports, Employment and Firms

We begin by highlighting how the U.S. tariff cuts affect Vietnamese exports to the U.S. and other major destinations. This analysis establishes how responsive exports are to a one-time tariff reduction over a long period, and provides several verification checks on our empirical strategy. We then show that lower U.S. tariffs implemented in 2001 are associated with an expansion in Vietnamese industry employment over a long period, which we link to the entry of new foreign firms.

### 4.1 Empirical Methodology

To study the relationship between the U.S. tariff reductions and industry outcomes, we estimate the following regression:

$$Y_{jt} = \sum_{t'=t_0 \setminus 2000}^{t_N} \beta_{t'} \Delta BTA_j \mathbf{1}_{t'} + \lambda_j + \theta_t + \alpha_t C_{jt} + \varepsilon_{jt} \quad (1)$$

where  $Y_{jt}$  is the ln outcome for industry  $j$  in year  $t$ ,  $\Delta BTA_j$  is the change in U.S. tariffs on Vietnamese exports in industry  $j$  pre- and post-BTA,<sup>35</sup> indicator  $\mathbf{1}_{t'}$  equals one for year  $t'$  where  $t' \in [t_0, t_N]$ ,  $\lambda_j$  is an industry fixed effect, and  $\theta_t$  is a year fixed effect.  $C_{jt}$  are industry-specific time-varying controls including ln Chinese exports to the U.S. and other trade policy changes interacted with a full set of year indicators. These trade policy changes include U.S. import quotas applied to clothing and textile imports from Vietnam and China respectively, and the reduction in Vietnam's MFN import tariffs due to its WTO accession.<sup>36</sup> The BTA was implemented in 2001. The base year for outcome changes is 2000 and the key parameters of interest,  $\beta_{t'}$ , capture the cumulative impact of the U.S. tariff cuts on the outcome by each year  $t'$  relative to 2000. A positive value of  $\Delta BTA_j$  represents a tariff cut, so that a positive value of  $\beta_{t'}$  implies an increase in the outcome in response to the U.S. tariff reductions. Standard errors are clustered at either the 3- or 4-digit industry level corresponding to the level of industry aggregation.

The identification of the causal effect of U.S. tariff reductions on the outcomes of interest in Vietnam consequently relies on the assumption that changes in U.S. tariffs are not correlated with

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<sup>35</sup>We follow the standard approach in the trade literature and define the tariff change as  $\Delta BTA_j = \ln(1 + \text{U.S. Column 2 tariff in industry } j) - \ln(1 + \text{U.S. MFN tariff in industry } j)$ . For example, see Kovak and Morrow (2022).

<sup>36</sup>We measure Vietnam's MFN tariff reductions as  $\ln(1 + \text{MFN tariff value in year 2007}) - \ln(1 + \text{MFN tariff value in year 2013})$ . The industry quota measures are the fill rate following Brambilla, Khandelwal and Schott (2010).

unobserved time-varying industry-level factors. In section 2.1, we discussed that neither U.S. nor Vietnamese industries had the ability to influence the size of the U.S. tariff reductions. We also showed that these tariff changes are not correlated with baseline industry characteristics such as industry employment and the within-industry employment share of foreign, state, private. We further verify our identifying assumptions in the next subsection, before we move on to the key outcome of our analysis, employment.

## 4.2 BTA and Exports

We now examine the effects of U.S. tariff reductions on Vietnamese exports to the U.S., as well as to other major export destinations, using pre- and post-BTA data covering 1996 to 2018. This serves two purposes. First, the analysis establishes how the effects of the tariff reduction on Vietnamese exports to the U.S. accumulate over a longer period than is usually examined. This is helpful for understanding the time profile of employment responses to tariff cuts over the longer run in subsequent analysis. Second, this analysis serves as a further verification check for our empirical strategy, ruling out correlations with pre-existing industry trends and global demand shocks. We show that the U.S. tariff declines only impact exports *after* the BTA's implementation in 2001 and initially only for exports to the U.S. rather than to other major trading partners.

We first establish the time profile of the response of Vietnamese exports to the U.S. due to U.S. tariff reductions. The estimates of the coefficients on tariff change  $\beta_t$  from equation (1) with Vietnamese exports to the U.S. as the dependent variable are reported in Figure 5.<sup>37</sup> Positive and large estimates after 2001 suggest that tariff cuts are associated with an immediate and large increase in Vietnam's exports to U.S. over the first six years. The coefficient in 2008 is 17.8, which implies exports are 4.3 ln points larger in an industry that received the average tariff reduction (0.24 ln points) relative to one with no reduction. These effects persist and slightly rise over the subsequent decade, although the coefficients decrease in value in 2009 and 2010 (a period that overlaps with the Global Financial Crisis). The cumulative effect over the long run is 20.9 in 2017, implying that exports to the U.S. are 5 ln points larger for an industry that received the average tariff reduction compared to no tariff reduction.

Second, U.S. tariff changes have no effect on exports prior to the implementation of the agree-

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<sup>37</sup>We conduct our main analysis of exports at the 3-digit industry level because many 4-digit industries report no exports to the U.S. prior to the BTA, but also examine robustness of our results to industry aggregation and disaggregation to 2- and 4-digit industries (Figure C3).

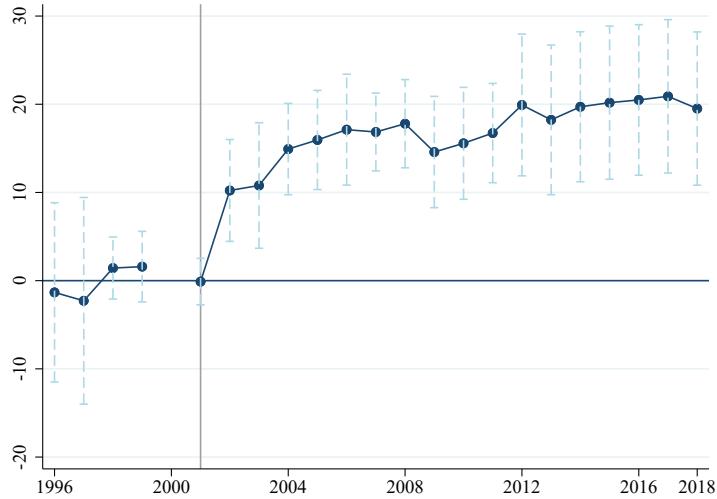
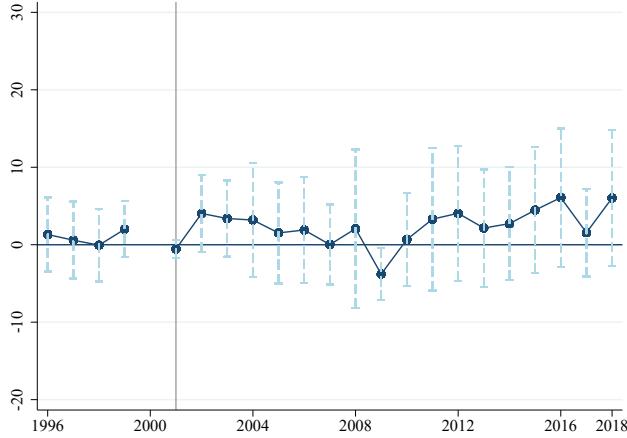


Figure 5: Vietnam Exports to the U.S. and BTA Tariffs, 1996-2018

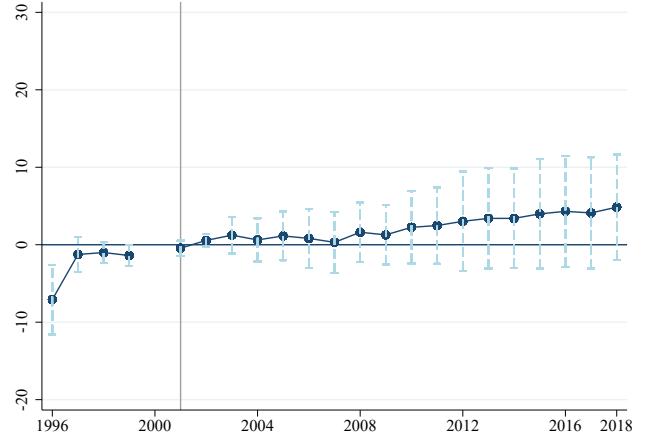
*Note:* Each point reflects an individual regression coefficient,  $\hat{\beta}_{t'}$ , following equation (1). The BTA was implemented in 2001 (indicated by the gray line) and the base year is 2000. The analysis is conducted at the 3-digit industry level. Controls include 3-digit industry FE, year FE, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 3-digit industry level. Weighted by year 2000 Vietnam exports to the world. Source: UN Comtrade, USITC, World Bank WITS, and authors' calculations.

ment in 2001. The estimates for years prior to 2000 are small in magnitude and statistically insignificant, ruling out spurious correlation between the U.S. tariff changes and pre-existing industry trends in Vietnam's exports to the U.S. Given the long period of our analysis after the BTA, we discuss in Appendix B.4 some of the other changes in trade policy that occurred after the implementation of the BTA and show they are unlikely to drive our results. Importantly, our empirical work examines the cumulative annual effects of the U.S. tariff cuts with annual data covering a long period rather than relying on data at the start and end of our period, a period that includes Vietnam's WTO entry in 2007. To the extent that WTO entry would be influencing our results, we would expect it to affect the estimated coefficients when it comes into effect after 2007 in Figure 5. Yet, there is no evidence of a large increase in the magnitude of the coefficient in 2007 (or thereafter), the year Vietnam joined the WTO. Robustness analysis in Appendix C.2 shows that the estimates in Figure 5 are robust to industry aggregation and disaggregation (Figure C3), the exclusion of each and all industry-specific controls  $C_{jt}$  (Figures C4 and C5a), and omission of any one industry (Figure C6).

Third, if our results were driven by spurious correlation between the BTA tariff cuts and contemporaneous global supply or demand shocks in an industry, we would expect these tariff cuts to be related to Vietnam's exports to its other major markets before and immediately after



(a) Vietnam Exports to the E.U.



(b) Vietnam Exports to East Asia

Figure 6: Vietnam exports to key trading partners and BTA tariffs, 1996-2018

*Note:* Each point reflects an individual regression coefficient,  $\hat{\beta}_{it}$ , following equation (1). The dependent variable in Figure 6a is  $\ln$  Vietnamese exports to the European Union (E.U.15 excluding Belgium and Luxembourg due to lack of data consistency). The dependent variable in Figure 6b is  $\ln$  Vietnamese exports to South Korea, Japan, China, and Hong Kong. Taiwan is excluded due to lack of trade data. The BTA was implemented in 2001 (indicated by the gray line) and the base year is 2000. The analysis is conducted at the 3-digit industry level. Controls include 3-digit industry FE, year FE, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the US in year  $t$ , and US import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 3-digit industry level. Weighted by year 2000 Vietnam exports to the world. Source: UN Comtrade, USITC, World Bank WITS, and authors' calculations.

the implementation of the BTA.<sup>38</sup> This is not the case. For example, if our results spuriously reflected growing demand for Vietnamese exports to high-income countries, the effect of U.S.-specific tariff cuts would also influence Vietnamese exports to other major high-income trade partners such as the E.U. However, the estimates of equation (1) for Vietnam's exports to the E.U. as the dependent variable yield coefficients that are smaller in magnitude and statistically insignificant, both before and in the immediate aftermath of the BTA (Figure 6a). Likewise, the U.S. tariff cuts are not correlated with Vietnam's exports to its major trading partners in East Asia, which are major sources of FDI to Vietnam, neither before nor in the immediate aftermath of the BTA's implementation (Figure 6b).<sup>39</sup> Both of these findings are also robust to the exclusion of each and all of our controls,  $C_{jt}$  (Figures C5b and C5c).

<sup>38</sup>In 2000, 31.2% of Vietnam's manufacturing exports are to East Asian trading partners (South Korea, Japan, Hong Kong, and China), 27.3% to the E.U., and 5.4% to the U.S. See Appendix B.2 for detailed discussion. As discussed in Section 2.2, Vietnamese exports already faced MFN tariffs in the E.U. and Japan prior to the BTA.

<sup>39</sup>Taiwan is excluded due to lack of trade data. South Korea, Japan, China, and Hong Kong make up almost 60% of employment in foreign firms in 2017 (Figure 4).

### 4.3 BTA and Employment

We find that these export opportunities are associated with large employment expansion in the formal manufacturing sector. Vietnamese industries subject to larger U.S. tariff reductions expand relative to industries with lower tariff cuts. The estimates of the coefficients on tariffs from specification (1) are reported in Figure 7a for employment and Figure 7b for the number of firms. Recall that during this period aggregate employment in formal manufacturing was growing (see Figure 2). Consistent with the results for U.S. exports, employment and the number of firms expand more in industries with bigger tariff cuts. While this expansion is consistent with the predictions of standard trade models, the estimated magnitudes of the cumulative effects are large and continue to increase in the aftermath of the agreement for 16 years. For example, the employment coefficient in 2007 is 1.69, implying that employment is 0.41 log points or 50% larger in an industry that received the average tariff reduction (0.24 ln points) compared to no tariff reduction six years after the agreement.<sup>40</sup> The coefficients continue to increase over the next 10 years to 2.77 in 2017, implying that employment is 0.66 log points or 93% larger in response to the mean BTA tariff cut.<sup>41</sup> Importantly, the coefficient in 1999 is very small and statistically insignificant (-0.09), which rules out spurious correlation between the U.S. tariff reductions and Vietnamese employment before its implementation.<sup>42</sup>

We are not aware of any papers that estimate the long run employment effects of reductions in tariffs on exports to key destination markets.<sup>43</sup> Following Pierce and Schott (2016), we estimate the implied total relative effect within manufacturing. First, we multiply the regression coefficient by the U.S. tariff reduction within each industry. This is the predicted change in ln employment for each industry relative to an industry that received no U.S. tariff reduction. Next, we calculate the average effect across industries using the relative employment size of industries in 2000 as weights. Our results suggest a relative increase in manufacturing employment of 0.39 ln points 6 years after

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<sup>40</sup>The expansion of formal manufacturing employment due to the BTA demonstrates that new export opportunities partially explain Vietnam's structural change during the early 2000s (McCaig and Pavcnik, 2017).

<sup>41</sup>Figure B17 shows that essentially all 4-digit industries experienced an expansion in employment during this period. There, the positive coefficient implies faster absolute growth, not just relative growth.

<sup>42</sup>In Appendix Section C.1.1 we use employment data at the 2-digit industry level to allow for a longer pre-BTA period and we report a small and statistically insignificant relationship between U.S. tariff reductions and employment in the 5 years prior to the BTA (1995-2000). After the BTA, we find similar results to Figure 7a using the same 2-digit data.

<sup>43</sup>Bustos (2011) focuses on technology upgrading over 5 years in Argentina in response to Brazilian tariff reductions and Trefler (2004) finds no effect on Canadian industry employment over 7 years in response to U.S. tariff reductions. Papers focusing on China's WTO entry capture the effects of the decrease in uncertainty about trade policy in the U.S. (rather than changes in tariff levels) and focus on firm productivity rather than employment.

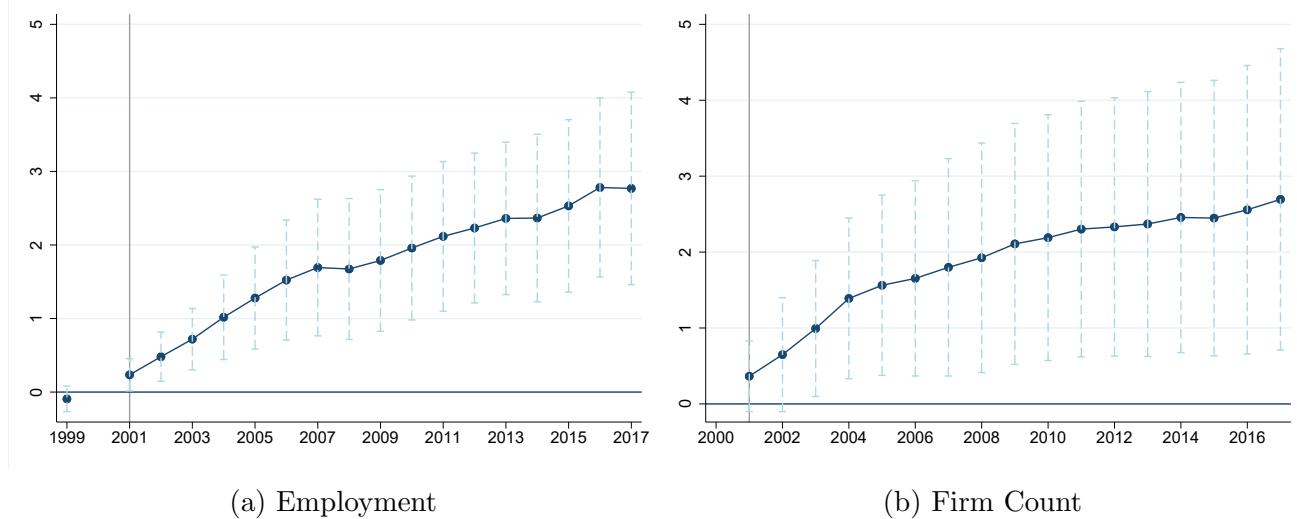


Figure 7: Firm count and employment and BTA tariffs, 1999-2017

*Note:* Each point reflects an individual regression coefficient,  $\hat{\beta}_{it}$ , following equation (1). The dependent variable in Figure 7b is the log annual number of firms in an industry. The dependent variable in Figure 7a is the log annual employment in an industry. BTA was implemented in 2001 (indicated by gray line) and the base year is 2000. The analysis is conducted at the 4-digit industry level. 4-digit industry FE and year FE are included. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment. Controls included in the regression are the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the US in year  $t$ , and an industry measure of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing.

the BTA. For comparison, U.S. manufacturing employment contracted by 0.22 ln points 6 years after the establishment of Permanent Normal Trade Relations with China, which reduced tariff uncertainty—not actual tariff levels.<sup>44</sup> By 2017, 16 years after the BTA, this approach suggests an increase of 0.64 ln points. This implies that almost 40% of the employment expansion by 2017 would have been missed if we had focused on the short run, the first six years.<sup>45</sup>

The time pattern of these estimates suggest immediate increases in employment in the first six years after the agreement, but the effects on employment continue to accumulate over the long run.<sup>46</sup> This might be at first surprising. These immediate and large responses, which subsequently increase over time, appear initially at odds with the literature that finds limited employment

<sup>44</sup>The 0.22 ln point reduction differs slightly from the result, -0.15 ln points, reported in Table 3 of Pierce and Schott (2016) as we scale this by the event study coefficient reported in column 3 for 2007 in Table A.4 to make it more directly comparable to our estimate for 2007.

<sup>45</sup>In section C.1.3 we flexibly control for possible pre-existing trends in industry employment by interacting the change in ln industry employment between 1999 and 2000 with a complete set of year indicators. These results suggest a slightly smaller long run effect as the coefficient in 2017 is 2.55 as compared to 2.92. By these estimates the long run employment effects would be an increase of 0.56 ln points.

<sup>46</sup>The time profile of employment responses in Figure 7a looks somewhat different than the exports to the US response in Figure 5, which show a much greater immediate response following the BTA. This is largely an accounting effect as total employment includes employment embodied in goods sold domestically, exported to the US and exported to other destinations. Since exports to the US were a small share of total manufacturing exports prior to the BTA, this implies a small initial base from which employment embodied in exports to the US would grow.

growth in formal firms in low-income countries (Hsieh and Klenow, 2014; Diao et al., 2021). We investigate further below.

**Where are the workers coming from?** The expansion of employment in the formal manufacturing sector in response to the US tariff reductions is consistent with broader employment patterns of contraction in agriculture and expansion of manufacturing as well as a reduction in the share of workers in informal firms (due to reallocation from agriculture and reallocation within manufacturing). See McCaig and Pavcnik (2015, 2017, 2018); Asghar and McCaig (2024). Asghar and McCaig (2024) use individual panel data from household surveys and focus on transitions into formal manufacturing in the industries most exposed to the US tariff reductions. Most of the transitions into formal manufacturing are done by individuals not already working in another formal manufacturing firm. Only 13.7% of individuals transitioning into these jobs were previously working in a formal manufacturing firm (see Table 2 in Asghar and McCaig (2024)). These transitions largely occur from individuals in school (25%), workers in agriculture (23%), and workers in informal manufacturing or services (22%). In appendix section [B.8](#), we show that workers in foreign firms, the ones expanding employment the most in response to the U.S. tariff reductions, are more likely to be women (66%), are younger on average than workers in state or private firms, are better educated on average than workers in private firms, but less than workers in state firms, and 37% have migrated internally across provinces within the five years leading up to the 2009 population census. Overall, this information provides additional context for the strong expansion of employment in formal manufacturing in response to the U.S. tariff reductions.

**What firms are driving these large responses?** First, firm entry and exit appear to be key dimensions of firm adjustment during this period (see Appendix [B.1](#)). Work by Haltiwanger, Jarmin and Miranda (2013) suggests that entrants and young businesses are an important component of employment growth in the U.S. Likewise, in our setting, tariff cuts are associated with changes in the number of firms. The estimates of the coefficients on tariffs from specification (1) for the number of firms as a dependent variable are reported in Figure [7b](#). The U.S. tariff cuts are associated with an immediate increase in the number of firms in industries with larger tariff cuts over the first 4-6 years after the BTA, with the cumulative effects growing over time. This pattern corresponds to the evolution of the cumulative effects of tariffs on employment. To explore this further, we will systematically decompose changes in employment within industries that occur

among entering firms, exiting firms, and incumbents in the next section.

Second, the discussion in Section 2.4 suggests that the foreign affiliates of multinationals might respond differently to the effects of lower U.S. tariffs on exports from Vietnam compared to Vietnamese domestic firms (state and private). We therefore estimate equation (1) separately for employment in foreign, state, and private firms and report the results in Figure 8.<sup>47</sup> Consistent with the conceptual framework, U.S. tariff cuts are associated with increased employment in foreign firms (Figure 8a).<sup>48</sup> The cumulative effects on employment in foreign firms grow for 8-10 years, and continue to grow over time (albeit at a slower rate). In addition, the magnitude of the effects for foreign firms is bigger than for state or private firms, although they are not statistically different.<sup>49</sup> While the coefficients on tariffs on state and private firms are positive and growing over time as well, they are smaller in magnitude and noisy. The more subdued tariff-cut induced employment increase of private firms is consistent with trade frictions that are more likely to affect private domestic firms than foreign firms and the general lack of employment growth in domestic firms in lower-income countries.

Entry of foreign firms could contribute to the differential effects, as suggested by the conceptual framework. To examine this, Figure 9 reports the estimates of the coefficients on tariff cuts when equation (1) is estimated with the ln cumulative number of entrants in an industry relative to 2000, the ln cumulative number of foreign entrants, and ln cumulative number of private entrants, respectively.<sup>50</sup> The positive estimates of the coefficients suggest that industries with larger tariff cuts observe a greater increase in entrants (Figure 9a).<sup>51</sup> The cumulative effects of the BTA on

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<sup>47</sup>Figure D1 estimates the same equation separately for number of firms by each ownership type. By estimating equation (1) separately by ownership, this allows the industry fixed effects, year fixed effects, and the influence of control variables to vary by ownership. Hence, this approach controls for any ownership-specific aggregate trends or ownership-specific differences across industries, as well as ownership-specific responses to the controls  $C_{jt}$ .

<sup>48</sup>The coefficients on tariff reductions in 1999 are small and insignificant, confirming the lack of correlation between tariff cuts and pre-existing trends in employment by ownership. These results are robust to including other major changes in trade policy during this period as controls (Figure B15), consistent with the low partial correlations between the U.S. tariff cuts and each of these changes in trade policy (Figure B14). The U.S. tariff cuts are also associated with an increased number of foreign firms (Figure D1a). In addition, discussion in Appendix C.1.2 and Table C4 shows that changes in industry employment between 1998 and 2000 for state and private are not correlated with the U.S. tariff reductions using 2-digit industry employment. Changes in ln employment in foreign prior to the BTA are negatively related to subsequent U.S. tariff reductions, opposite to what we find post-BTA.

<sup>49</sup>Figure B17 shows almost all industries experienced an expansion in employment within foreign and private firms. In contrast, most industries experienced a contraction in employment in state firms. Thus, the positive coefficient on foreign employment is associated with relatively larger increases in employment whereas the positive coefficient on state employment is largely due to relatively slower contraction of employment in response to the tariff reductions.

<sup>50</sup>Since our first year of data is 2000, 2001 is the first year for which we can observe entry. Thus, we can no longer use 2000 as our base year for regression analysis. As such, 2001 becomes our baseline for measuring entry.

<sup>51</sup>Some of the private entrants could be simply entrants into the formal sector, who had previously been operating

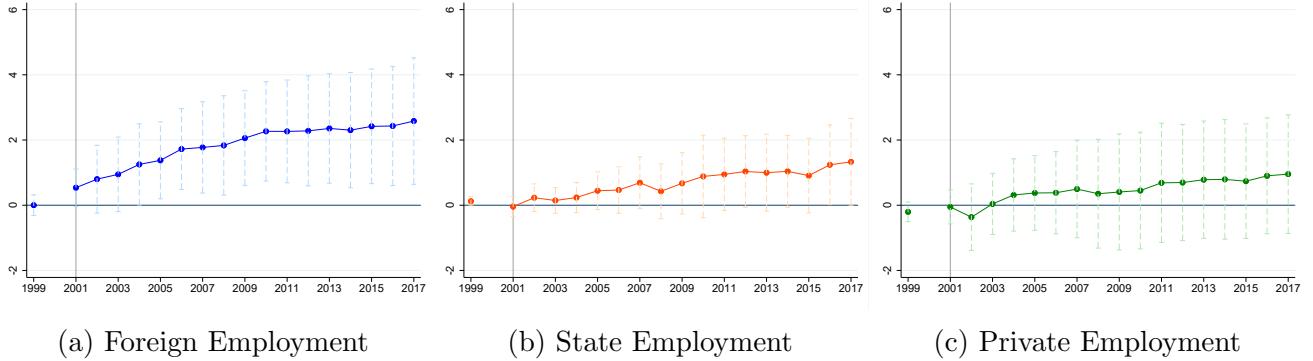


Figure 8: Employment by ownership and BTA tariffs, 1999-2017

*Note:* Each point reflects an individual regression coefficient from estimating equation (1) separately for each ownership type, where the independent variable is the change in U.S. tariff applied to Vietnamese exports in an industry before and after the BTA ( $\Delta BTA_j$ ). The dependent variable is the log annual employment in an industry for foreign in Panel (a), state in Panel (b), and private in Panel (c). The BTA was implemented in 2001 (indicated by the gray line) and the base year is 2000. The analysis is conducted at the 4-digit industry level. In separate ownership regressions for each panel, controls include 4-digit industry FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

entry, particularly of foreign firms, grow for 5-6 years after the BTA to about 0.54 log points (72%) in 2006 in response to the mean BTA tariff cut, after which they remain relatively steady (Figure 9b). For exit responses, we find little effect for private firms, a slight increase in cumulative exit for foreign firms, and a decrease in cumulative exit for state firms. See Appendix Section D.5.

The coefficients on tariffs in Figure 9a imply an elasticity of entry with respect to tariff of 0.72 in the short run 2 years post-BTA (2003) and 1.57 in the long run after 12 years (2013). The estimates are larger for foreign affiliates (Figure 9b), with an elasticity of foreign entry with respect to tariff of 1.27 in the short run (2003), and 2.45 in the long run (2013). Recall that our definition of foreign entry is new firms rather than acquisitions. Our estimates suggest that a one-time change in variable export costs increases cumulative foreign affiliate entry in a host country rapidly in the years immediately following the BTA, up to about 2006. Thereafter, cumulative foreign entry is relatively unchanged. This time profile is very similar to that for exports to the U.S. (Figure 5), suggesting that the two responses are closely linked. These results suggest that industries that received larger U.S. tariff reductions ended up with a persistently higher number of foreign entrants over the long run. This is a novel finding because studies with export-oriented multinational firms rely on quantitative modeling (rather than empirical analysis) and tend to focus on the effects of lower export costs that operate through intensive margin adjustment of

as an informal business, i.e., the business formalized. Appendix subsection B.1.1 provides evidence that most private firms in the formal sector did not start as informal firms.

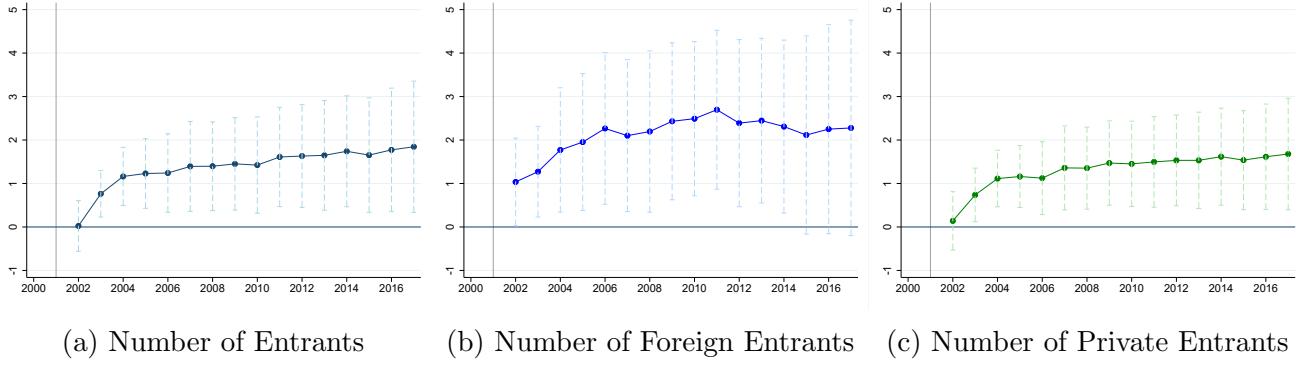


Figure 9: Number of entrants by ownership and BTA tariffs, 2000-2017

*Notes:* We define the cumulative number of entrants as the difference between the number of firms in year  $t$  and the number of those firms that were operating in 2000. Each point reflects an individual regression coefficient from estimating equation (1) separately for all ownerships, foreign, and private in panels (a), (b), and (c) respectively. The dependent variable is the ln cumulative number of entrants. The BTA was implemented in 2001 and the base year is 2001 due to our definition of entry (indicated by the gray line). The analysis is conducted at the 4-digit industry level. Controls include 4-digit industry FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

existing foreign affiliates (Tintelnot, 2017) or through product entry (Head and Mayer, 2019). An important exception is Garetto et al. (2024) which studies the dynamics of foreign affiliate entry. Their study highlights the importance of sunk costs of establishing affiliates for prolonged adjustment to trade shocks, something that we empirically confirm in our novel setting.

Overall, the above analysis highlights that industry employment continues to grow in response to the U.S. tariff reductions over the long run, 16 years, particularly in foreign firms, and the potential importance of tariff-induced entry of foreign firms in explaining the differential growth of industry employment. This analysis covers the direct effects of the U.S. tariff reductions and does not include possible indirect effects, such as from foreign firms purchasing inputs from domestic firms. However, these indirect effects are likely to be small in this context as foreign exporters purchase less than 20% of their inputs from domestically-owned firms (see discussion of Table B3 in section B.3). We thus focus on direct effects.<sup>52</sup>

<sup>52</sup>See section B.3 for more discussion of limited linkages between foreign and domestic firms. In addition, we do not have the necessary data to construct separate input-output tables for foreign and domestic firms and Barrios, Görg and Strobl (2011) have highlighted the concerns from using an aggregate IO table when purchasing behavior differs substantially between foreign and domestic firms. We leave this for future research.

## 5 Changes in Employment Within Industries

This section follows up on the findings from previous section, which highlighted the potential importance of tariff-induced entry of foreign firms for industry employment growth. In particular, we use a framework that enables us to additively decompose tariff-induced changes in employment shares within industries into changes across foreign (and domestic) firms and firm adjustment status (i.e. continuers, entrants, and exiters). We find that U.S. tariff cuts lead to a shift in employment toward foreign firms within industries, particularly foreign entrants, demonstrating that the overall growth in industry employment is largely accounted for by foreign entrants.<sup>53</sup>

We construct the change in employment shares by firm ownership and status in each industry and year relative to base year 2000, the year prior to BTA implementation. That is,  $\Delta es_{jost} = \frac{E_{jost}}{E_{jt}} - \frac{E_{jos,2000}}{E_{j,2000}}$  where  $E_{jost}$  is total employment in firms of initial ownership  $o$  and status  $s$  in industry  $j$  in year  $t$ , and  $E_{jt}$  is total employment in industry  $j$  in year  $t$ . A continuing firm is defined as one that operates in both year  $t$  and base year, 2000. We focus on cumulative entry and exit up to year  $t$  relative to 2000. Exiters in year  $t$  are firms that were present in 2000, but not in year  $t$ . Entrants in year  $t$  are firms that appear in year  $t$ , but were not present in 2000.<sup>54</sup>

We estimate the following specification for each ownership  $o$ , status  $s$ , and  $t > 2000$ :

$$\Delta es_{jost} = \beta_0 + \beta_{ost} \Delta BTA_j + \alpha_{ost} C_{jt} + \varepsilon_{jost} \quad (2)$$

where  $\Delta BTA_j$  is the change in U.S. tariffs on Vietnamese exports in industry  $j$  before and after the BTA and  $C_{jt}$  is a vector of our previously introduced controls.<sup>55</sup> The coefficients on  $\Delta BTA_j$ ,  $\beta_{ost}$ , capture the cumulative U.S. tariff reduction impact on the change in employment share by each ownership-status-year combination,  $ost$ , relative to the base year, 2000. A positive value of  $\Delta BTA_j$  represents a tariff cut, so that a positive value of  $\beta_{ost}$  implies an expansion in employment share in response to the U.S. tariff reductions. The specification in equation (2) is similar to our

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<sup>53</sup>See section D.1 for an alternative approach that additively decomposes long run growth in industry employment by ownership and firm status. This approach similarly highlights that foreign entrants accounted for most of the industry employment growth response to U.S. tariff reductions.

<sup>54</sup>The change in employment share for exiters is necessarily negative since their employment share in year  $t$  is 0. Correspondingly, the change in employment share for entrants is necessarily positive since their employment share in year 2000 is 0. The employment share changes sum to 0 in each industry-year. As before, we define a firm's industry and ownership based on its initial industry and ownership.

<sup>55</sup>Controls include the change in Vietnam's MFN tariffs due to WTO accession measured as the change in ln of 1+MFN between 2007 and 2013, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US imports quotas applied to Vietnamese and Chinese exports of textiles and clothing. We show in Section 5.1 that our results are robust to the exclusion and subsequent inclusion each of these controls.

earlier specification, but it is estimated separately for each year relative to the baseline (e.g., 2001 and 2000, 2002 and 2000, etc.). This allows us to update the definition of whether a firm that operated in 2000 is a continuer in year  $t$  or an exiter in year  $t$ . For example, a firm that operates in 2000 and exits in 2006, would be defined as a continuer for years 2001 through 2005 and as an exiter thereafter.

Equation (2) is estimated separately for each ownership-status,  $os$ . This flexibly allows for each ownership-status combination to be on its own time path, allowing, for example, for underlying aggregate differences in patterns of foreign entry and in other firm ownership types (such as the exit of state firms). We weight by industry employment in 2000. The estimation results are presented in figures below, which report the series of coefficient estimates of  $\beta_{ost}$ , with 95 percent confidence intervals. Each series of coefficients is estimated from 17 individual regressions for each outcome of interest.

## 5.1 The Role of Foreign Entrants

The analysis demonstrates that tariff reductions were associated with a shift in within-industry employment shares to foreign firms, particularly to entering foreign firms. We present our findings gradually in two steps, to highlight the importance of tariff-cut induced increases in employment shares of foreign entrants for more aggregate effects.

First, Figure 10 reports the estimates of the coefficients on tariff cuts from equation (2) for foreign and domestic (state and private) firms. The results show a cumulative shift of employment toward foreign firms with tariff cuts that increases over time, consistent with tariff-induced increases in foreign employment shown in Figure 8a. Although the individual coefficients are at times imprecisely estimated, the implied cumulative shift in employment toward foreign firms is considerable.<sup>56</sup> By 2007, relative to an industry that experienced no tariff reduction, an industry that experienced the mean tariff reduction saw the foreign share of employment increase by 5.4 percentage points and this continued to increase to 8.3 percentage points by 2017. Since overall state employment is contracting during this period (Figure 2), the positive coefficients on tariff cuts for state firms suggest a slower but imprecisely estimated decline in state employment

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<sup>56</sup>When we pool results into 8-year periods, we find a statistically significant positive coefficient for the employment share in foreign firms for 2001-2008 and 2009-2017 (Appendix Table C9, Column (1)). See Appendix Section C.6 for further details.

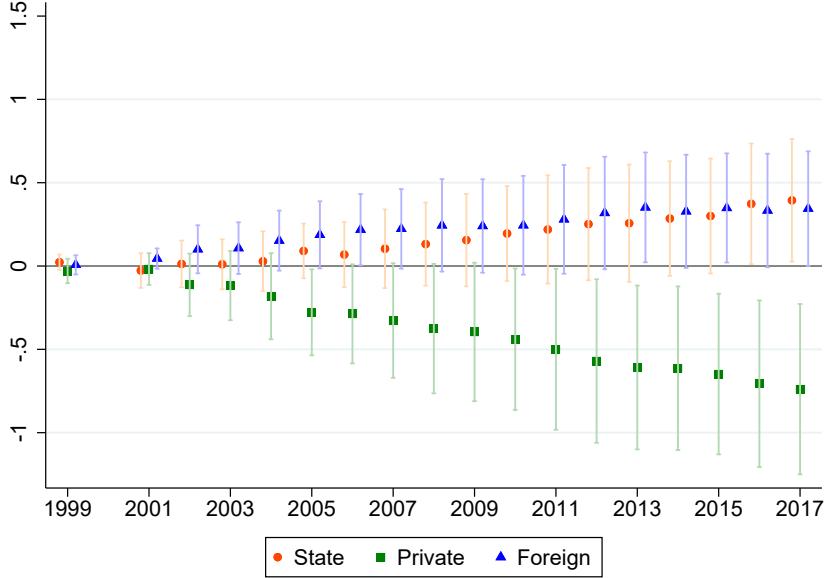


Figure 10: Changes in within-industry employment shares for state, private, and foreign and BTA tariff cuts

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2). The base year is 2000 and the observations are weighted by 2000 employment. The analysis is conducted at the 4-digit industry level. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

shares in industries with higher tariff cuts compared to less affected ones.<sup>57</sup> Importantly, while the post-BTA effects are large, the point estimates for foreign in 1999 (and all other firm ownership types) in Figure 10 are very close to 0 and statistically insignificant. This confirms that changes in within-industry employment shares by firm ownership prior to the BTA (i.e. between 1999 and 2000) are not correlated with the U.S. tariff cuts, consistent with the lack of pre-existing trends in trade flows and industry outcomes in Sections 4.2 and 4.3. Table C5 further shows that changes in within-industry employment shares by ownership between 1998 and 2000 are not correlated with the U.S. tariff reductions using 2-digit industry employment. See Section C.1.2 for further discussion. Overall, this within-industry decomposition suggests that the tariff-cut induced expansion of employment in industries with bigger tariff cuts is heavily influenced by the expansion of foreign firms and grows over time.

Second, foreign entrants are driving the expansion of the employment share among foreign firms. Figure 11 further decomposes changes in the FDI employment share into entrants, con-

<sup>57</sup>While most industries experienced a decline in state employment, 33 out of 104 four-digit industries experienced growth (Panel (c), Figure B17).

tinuers, and exiting firms and displays the estimates of the coefficients on U.S. tariff cuts from equation (2) for foreign continuers, entrants, and exiters. The most striking result is the shift in employment share toward foreign entrants that consistently grows throughout the post-BTA period in response to the U.S. tariff reductions. This illustrates that foreign entrants are primarily responsible for the expansion of foreign employment in response to the U.S. tariff cuts. By 2007, relative to an industry that experienced no tariff reduction, an industry that experienced the mean U.S. tariff reduction saw the employment share in foreign entrants grow by 11.1 percentage points and this continued to increase to 19.3 percentage points in 2017. The U.S. tariff cuts are associated with a decline in the employment share of foreign continuers, and little effect due to foreign exiters. The shift toward foreign entrants occurs as the share of employment in foreign continuers falls by 8.6 percentage points. The entry of foreign firms is partly offset by the relative contraction (i.e., not expanding as fast as overall industry employment) of continuing foreign firms. Note that employment in foreign continuers is growing in aggregate during this period (see Figure D8) and industry employment among foreign continuers grows somewhat in response to the U.S. tariff reductions (Figure D9b), but less so than for overall employment and hence the declining share. Again, we do not see any large changes in these results after Vietnam's WTO accession in 2007. These results are not particularly sensitive to the exclusion of controls,  $C_{jt}$ , in equation (2) (Appendix Figure C11) nor omission of any one industry (Appendix Figure C12). In Section C.5 and Figures C13 and C14 we also show that the results are robust to alternative definitions of firm entry.

The evidence on tariff-induced shift in employment toward foreign entrants is consistent with the conceptual framework discussed in Section 2.4, where a decision of a MNE to establish an affiliate in a host country depends on the variable trade costs of exporting from that destination, variable production costs, and additional fixed costs of setting up a new production facility. The evidence is consistent with the fact that, once the U.S. lowered tariffs on exports from Vietnam, reducing the variable costs of exporting from Vietnam, the foreign affiliates were more likely to cover the fixed cost of setting up production in Vietnam. We provide further evidence on the link between exporting, foreign affiliate entry, and source countries of foreign affiliates in Section 6.

Third, we show that foreign entrants are the biggest contributors to changes in within-industry employment shares. Table 2 reports the estimated coefficients on the tariff cuts from the end of our period, 2017, which measure the cumulative effects of tariff cuts relative to 2000, for

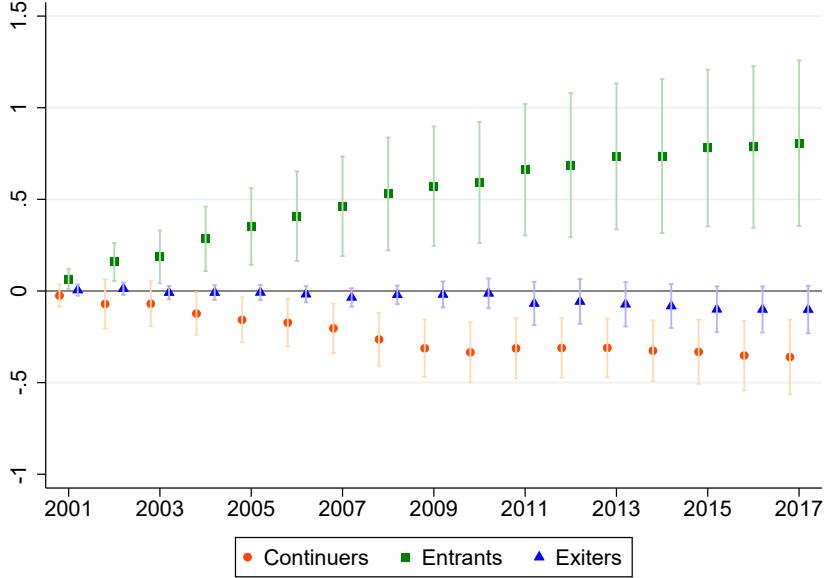


Figure 11: Changes in within-industry employment shares for foreign continuers, entrants, and exiters and BTA tariff cuts

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2). The base year is 2000 and the observations are weighted by 2000 employment. The analysis is conducted at the 4-digit industry level. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

foreign continuers, entrants, and exiters with those for state and private continuers, entrants, and exiters.<sup>58</sup> It is important to recall that state employment is contracting in most industries during this period (Figure B17). Thus, the positive coefficients on tariff cuts for state firms largely reflect slower (but imprecisely estimated) contraction of state employment shares in industries with higher tariff cuts relative to less affected industries, as shown by the positive coefficient on state exiters. Tariff cuts are also associated with decreased employment share of private firms despite employment in private firms growing in almost all industries (Figure B17). Most importantly, this table highlights the dominant role of shifts in employment shares toward foreign entrants, over the long run, relative to continuing and exiting firms. This is consistent with foreign affiliates being potentially best positioned to respond to tariff cuts, as discussed in Section 2.4, contributing to expanding employment in the formal manufacturing sector. For private firms, we instead find that the tariff cuts induced employment to shift away due to a combination of decreases in the private employment shares of continuers, entrants, and exiters. Furthermore, the positive coefficients on

<sup>58</sup>See Figures D2 and D3 for year-by-year plots for all, state, and private by status as well as additional discussion in Appendix D.2.2.

Table 2: Change in employment share coefficients in 2017

	All	Foreign	State	Private
Continuers	-0.403* (0.228)	-0.360*** (0.103)	0.201 (0.170)	-0.243** (0.108)
Entrants	0.409* (0.240)	0.806*** (0.228)	-0.086* (0.049)	-0.312 (0.308)
Exiters	-0.006 (0.152)	-0.101 (0.065)	0.279*** (0.092)	-0.183 (0.134)
Total		0.345** (0.173)	0.394** (0.185)	-0.739*** (0.258)

*Note:* \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Each coefficient represents an estimate of  $\beta_{ost}$  from equation (2) using the change in employment share between 2000 and 2017. The analysis is conducted at the 4-digit industry level and the observations are weighted by 2000 employment. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in ln Chinese exports to the US in 2017 relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

tariff cuts for state continuers and exiters reflect less employment contraction in incumbents and through exit for state firms in industries with higher tariff cuts relative to less affected industries.<sup>59</sup> This suggests state firms might face different incentives than private and foreign firms.<sup>60</sup>

Our results connect to findings on resource reallocation between foreign and domestic firms (Aitken and Harrison, 1999; Alfaro and Chen, 2018; Bao and Chen, 2018) and to findings on firm performance and trade in the presence of politically connected firms (Khandelwal, Schott and Wei, 2013; Bai, Jin and Lu, 2019; Berthou et al., 2019). We find slower contraction of state employment in industries with bigger tariff cuts in a major export market. This is complementary to studies in the existing literature, which have found that state firms are less likely to exit due to increased import competition (Brandt et al., 2017; Baccini, Impullitti and Malesky, 2019).<sup>61</sup>

## 5.2 Long Term Effects on Foreign Entrants: Entry vs Subsequent Growth

In section 4 we showed that employment in foreign firms continued to expand in response to the U.S. tariff reductions up to 2017. In subsection 5.1, we showed that the expansion of foreign

<sup>59</sup>See Appendix D.5 for additional results and discussions on tariff-induced firm exit.

<sup>60</sup>In Appendix D.1 we provide complementary results by additively decomposing total growth in industry employment by ownership and firm status. These results similarly highlight the important role of foreign entrants for industry employment expansion.

<sup>61</sup>Brandt et al. (2017) and Baccini, Impullitti and Malesky (2019) find that state firms are not subject to the same competitive pressures due to increased import competition in response to WTO accession in China and Vietnam, with state firms less likely to exit in response to import tariff cuts relative to domestic firms.

employment occurred predominantly within foreign entrants. In this subsection we highlight the importance of a long period that allows us to study post-entry employment growth among foreign entrants in response to U.S. tariff cuts.

The importance of foreign entry is due to two components: employment at entry and subsequent employment growth. To set the stage, we first provide descriptive analysis of post-entry growth. We find that post-entry employment growth is much larger for foreign entrants than for domestic entrants. We focus on the cohort of firms that entered in 2001, the entry cohort that we can follow for the longest post-entry period, and track the surviving members of this entry cohort over time. For each year, we report the mean of employment at entry in 2001 across surviving entrants. This allows us to see whether the surviving entrants are larger on average than those that exit. We also report the mean of contemporary employment across surviving entrants. The difference between the two figures is how much surviving entrants have grown over time. Figure 12a demonstrates that employment in foreign entrants grows significantly after entry. Foreign entrants that survive are slightly larger, on average, than those that exit, as shown by the dashed blue line. However, this line slopes upward only slightly. It is subsequent growth after entry that drives the large increase in employment among foreign entrants. By 2017, foreign entrants that survive are on average more than 4 times larger in terms of employment than at entry.

Figure 12b summarizes the relative employment growth after entry among surviving entrants across foreign, state, and private, by normalizing their employment at entry at 1.<sup>62</sup> Foreign entrants experience sustained growth relative to state or private entrants: 16 years after entry, a surviving foreign entrant is almost 5 times larger than when it entered and still growing. In contrast, surviving private entrants are only about 1.5 times larger after 16 years and have stopped growing on average while state entrants are smaller than at entry and declining.<sup>63</sup> Note that the sustained large employment growth of new foreign affiliates is not easily explained by existing theories of MNE affiliate location decisions.

The regression results in Table 2 and Figure 11 suggest that industries with higher tariff cuts experience increases in employment mainly through foreign entrants, with the cumulative effects of tariff cuts increasing over longer time periods. Given the sizable long run post-entry employment growth among foreign entrants (Figure 12a), we examine how within-industry employment shifted

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<sup>62</sup>See Figure D4 for state and private entrant employment in levels.

<sup>63</sup>The slow employment growth among private firms is consistent with patterns documented in other low- and middle-income countries, such as India and Mexico (Hsieh and Klenow, 2014).

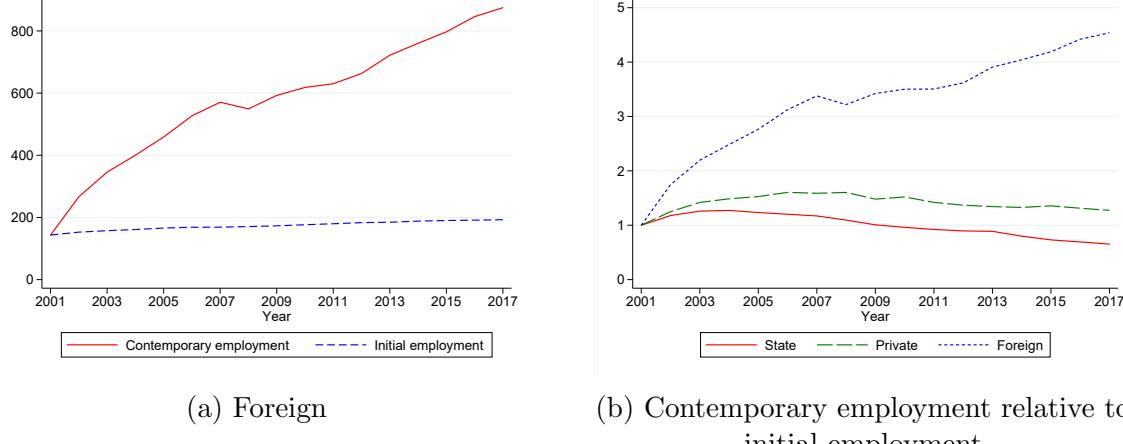


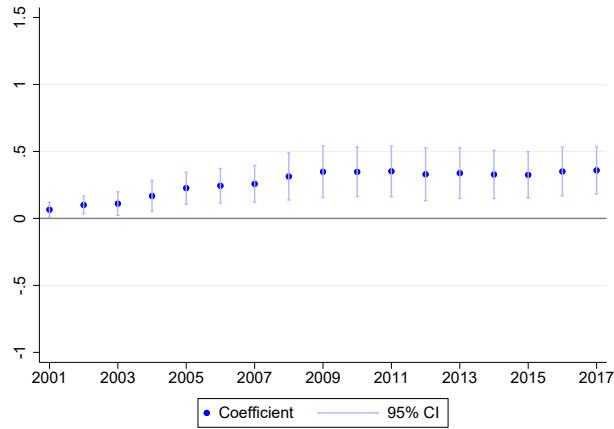
Figure 12: Contemporary and initial employment among surviving entrants, 2001 entry cohort

*Note:* Figure (a) reports mean employment among foreign-invested enterprises that entered in 2001. For each year after 2001, the figure reports mean contemporary employment and mean initial employment among surviving members of the 2001 entry cohort. Figure (b) shows the ratio of mean contemporary to mean initial employment for surviving members of the 2001 entry cohort for state, private and foreign firms respectively. Source: Vietnam GSO and authors' calculations.

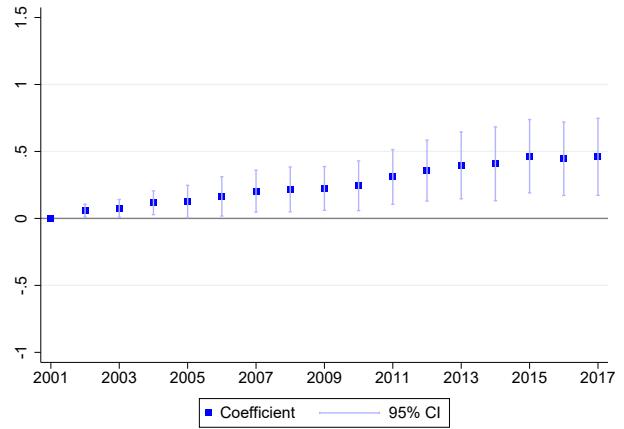
toward foreign entrants in higher tariff cut industries.

In particular, we analyze how much of the effects of tariff cuts on the change in the employment share of foreign entrants is driven by employment at entry versus post-entry employment growth. We decompose the employment share change  $\Delta es_{jost}$  into the change in the employment share due to initial employment at entry and due to subsequent changes to employment after entry. A specific example will help clarify the approach. Consider employment in industry  $j$  in year  $t$  accounted for by firms of ownership type  $o$  that have entered since 2000. The quantity  $E_{jost}$  is the sum of initial employment in the year of entry plus subsequent changes  $E_{jost} = E_{jost} - E_{jost^e} + E_{jost^e}$  where we use the subscript  $t^e$  to denote the year of entry. Hence, for entrants we can rewrite the change in employment share as:  $\Delta es_{jost} = \left( \frac{E_{jost} - E_{jost^e}}{E_{jt}} \right) + \left( \frac{E_{jost^e}}{E_{jt}} - \frac{E_{jost,2000}}{E_{j,2000}} \right)$  where the first bracketed term captures the change in employment since the year of entry and the second bracketed term measures the change in the employment share due to initial entry. In other words, if entrants did not grow after initial entry, the change in employment share would only be due to the second bracketed term.

We estimate equation (2) for foreign entrants from all years, with the above two components as dependent variables separately, thereby decomposing the foreign entrant coefficients in Figure 11 into these two components. Figure 13a shows the estimates of the U.S. tariff cut effects that operate through the contribution of initial employment (second bracketed term, above decomposition) and



(a) Initial employment



(b) Change in employment after entry

Figure 13: Decomposing changes in within-industry employment shares for foreign entrants by initial and subsequent employment and BTA tariff cuts

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2). The base year is 2000 and the observations are weighted by 2000 employment. The analysis is conducted at the 4-digit industry level. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

Figure 13b shows the estimates that operate through the contribution of growth after entry (first bracketed term in the decomposition above). The effects through employment at entry dominate initially, but plateau in terms of contribution around 2009 or 2010. The effects of tariff cuts through subsequent growth among foreign entrants start off smaller in magnitude, but continue to expand the overall contribution of foreign entrants to within industry employment share changes post 2010, stabilizing by 2015. By 2017 more than half of the effects of tariff cuts are due to post-entry employment growth. These results shed light on why employment in foreign firms continues to grow throughout the period while cumulative foreign entry stalls around 2008 or 2009 (Figure 9b). The foreign entrants that entered early on in response to the U.S. tariff reductions continued to grow after entry, driving up employment in the long run.<sup>64</sup>

<sup>64</sup>Theory papers that focus on MNE decisions on where to establish affiliates do not feature dynamic adjustment of affiliates, other than to changes in aggregate conditions (Garetto et al., 2024). For example, there is no learning about production conditions in the host country. Dynamic models of firms and trade implicitly focus on domestic firms, not affiliates of MNEs, and dynamics related to exporting and importing (Alessandria, Arkolakis and Ruhl, 2021).

## 6 Foreign Entrants, Exports, and Sources of Capital

As discussed in Section 2.4, the literature on factors contributing to foreign affiliate establishment emphasizes variable trade costs (including trade policy), variable production costs (including wages and the costs of other inputs), and additional fixed costs of setting up new production facilities. Our results in previous sections show that the reductions in U.S. tariffs on Vietnamese exports, which lowered variable trade costs, were associated with the entry and employment expansion of foreign multinationals affiliates. Here, we provide further evidence that the observed association between U.S. tariff cuts, foreign entry, and subsequent employment growth among foreign entrants is closely linked to exporting. We then show that the source countries of foreign firms that are driving these responses are from East Asia, not the U.S., highlighting that the geography of global value chains plays an important role and that the opportunities created by bilateral agreements are not just limited to the signing parties. Lastly, we provide evidence that Vietnamese exports to other trading partners expand in the long run in response to the U.S. tariff reductions.

**Exporters drive the increase in employment share of foreign entrants** Foreign firms play a substantially larger role in exporting, including exporting to the U.S., compared to state and private firms. This is due to a higher propensity to export, higher export intensity, and exporting more immediately upon the start of operations relative to private and state firms. As we show and discuss in Appendix B.3, 65-75% of foreign firms export (accounting for 90% of workers in foreign firms) and foreign exporters export about 80% of their output (Figure B10). In addition, foreign entrants are much more likely to start exporting in the first year of operation, with 85% of them reporting exporting within one year from the start of operations. The corresponding numbers are substantially lower for private firms. The importance of exporting for employment in foreign entrants is confirmed in Figure 14, which decomposes the tariff coefficients for foreign entrants in Figure 11 into effects that occur in exporters and non-exporters for years where data on exporter status is available.<sup>65</sup> If foreign entrants are not influenced by the U.S. tariff cuts through exporting, we would expect the coefficient on tariffs to be small in magnitude and statistically insignificant for exporter entrants (or similar in magnitude to non-exporters). Instead, we find

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<sup>65</sup>Exporting status is based on year  $t$ . The annual enterprise survey does not report firm-level exports by destination country and the General Department of Vietnam Customs does not share transaction-level import and export data with researchers. Transaction-level customs data matched with firm-level employment in low-income countries is rare. For example, the World Bank's Exporter Dynamics Database does not include information on employment, nor does it include Vietnam.

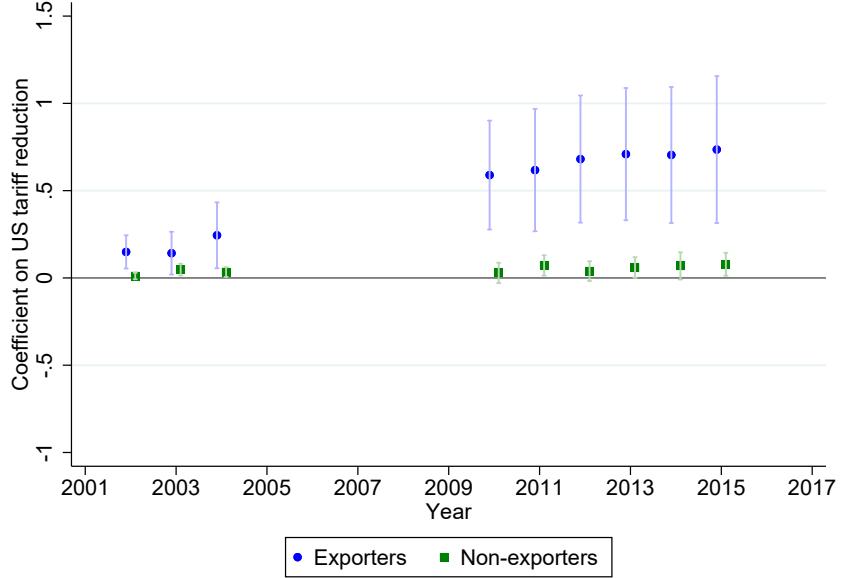


Figure 14: Changes in foreign entrant employment shares for exporters and non-exporters and BTA tariff cuts

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2). Exporter status is only observed for a subset of years. The base year is 2000 and the observations are weighted by 2000 employment. The analysis is conducted at the 4-digit industry level. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in In Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

that the tariff coefficients for exporter entrants are similar in magnitude to the tariff coefficients on the overall foreign entrants from Figure 11, while the coefficients for non-exporter entrants are small in magnitude and mostly statistically insignificant.<sup>66</sup>

This pattern is also consistent with the post-entry employment growth in foreign firms being concentrated among exporters. Appendix Figure D5 repeats the analysis from Figure 12a by separately tracking initial and post entry employment of the cohort of foreign firms that entered in 2001, split into those that exported in 2002 and those that did not export.<sup>67</sup> At time of entry

<sup>66</sup>The use of overall exporter status (rather than status as an exporter to U.S.) might potentially be problematic because it does not provide direct evidence that these exporters export to the U.S. However, to the extent the exports to the U.S. do not play a role in exporting for foreign entrants, we would expect the magnitude of the coefficient on tariffs for exporters to be small in magnitude and statistically insignificant. Yet, the coefficients are large in magnitude and statistically significant. This is consistent with regression results in Figure 5, which illustrated with industry-level data, Vietnamese exports expanded due to US tariff cuts, with the cumulative effects increasing over time. Furthermore, in Appendix B.3, we use the 2009 Vietnam Technology and Competitiveness Survey, which includes information on exporting by destination for a subsample of foreign and private firms from the annual enterprise survey, and show that almost a quarter of foreign firms that export (accounting for 41% of workers in foreign firms) list the U.S. as either their primary or secondary export market.

<sup>67</sup>We focus on exporter status in 2002 because that is the first year in which firms report exporting status. We find similar results for entry and export cohorts of other years (Figure D6). In particular, this pattern holds for the 2001 entry cohort based on exporting in 2004 or not, the 2001 entry cohort based on exporting in 2010 or not, and the 2005 entry cohort based on exporting in 2010 or not.

there is a relatively small difference in mean employment. However, the cumulative employment growth after entry is much stronger for foreign firms that are exporting in 2002 than for those that are not, with the difference increasing over time.

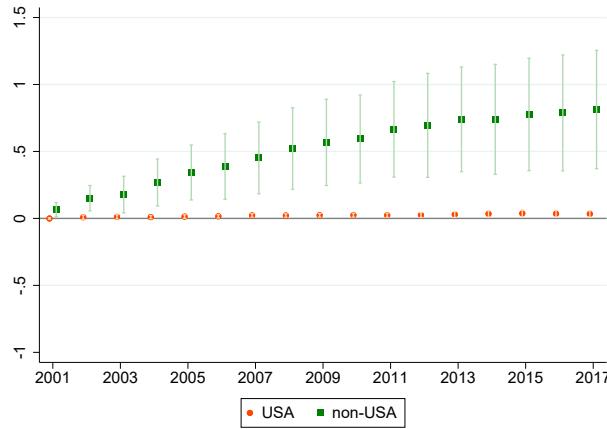
### **Foreign entrants from non-U.S. source countries drive employment share increase**

Our analysis focuses on one production location with information on foreign affiliates from all source countries and a large decline in tariffs in a key export destination, a unique perspective on the multinational literature. We find that the tariff-induced employment expansion is due to foreign affiliates from source countries other than the U.S., highlighting the importance of studying all sources of FDI, even if one of the source countries is the large export destination experiencing the trade policy change. The information on the source country of FDI in our data indicates that non-U.S. multinationals account for most of the employment in foreign-invested manufacturing in Vietnam prior to the BTA (as noted in Figure 4 earlier). When we separately estimate the tariff cut effects on employment share changes of foreign entrants by U.S. and non-U.S. source countries in equation (2), most of the effects are driven by affiliates of non-U.S. multinationals. Figure 15a decomposes the effects of U.S. tariff reductions on the changes in employment share of foreign entrants from Figure 11 into U.S. and non-U.S. ownership. Foreign entrants with U.S. ownership play a negligible role, with foreign entrants from non-U.S. source countries accounting for much of the estimated effects. Figure 15b presents the decomposition by Japan, South Korea, Taiwan, and other FDI source countries and shows that Japan and South Korea account for most of the tariff-cut induced employment share shift toward foreign entrants (note that the figure uses a different vertical scale to better display the variation between these source countries). This is consistent with UNIDO and MPI (2012) reporting that foreign companies most commonly learned about investment opportunities in Vietnam from firms in the same source country already operating in Vietnam.

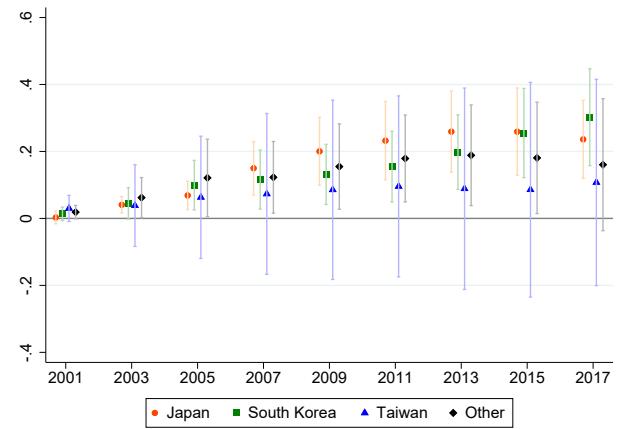
Consistent with the tariff-induced expansion of employment in non-U.S. foreign affiliates, we show that the tariff-induced increase in Vietnamese exports to the U.S. is not driven by affiliates of U.S. multinationals.<sup>68</sup> Using data from Antras (2016), Figure 16a reports the share of Vietnam's manufacturing exports to the U.S. from affiliates of U.S. multinationals (i.e. related party trade)

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<sup>68</sup>Categorized by the Census Bureau as related party trade, these transactions include trade by U.S. companies with their subsidiaries abroad as well as trade by U.S. subsidiaries of foreign companies with their parent companies. See notes in Figure 16 for more information.



(a) US and non-US foreign entrants



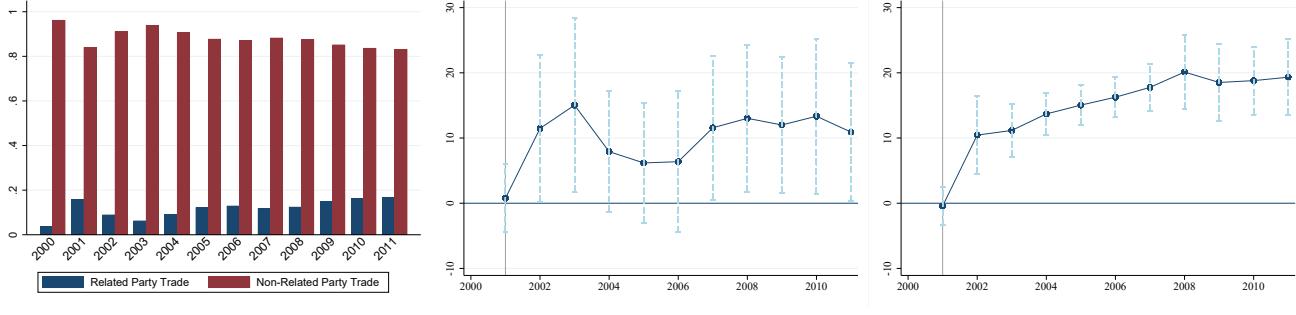
(b) Japanese, South Korean, Taiwanese and other foreign entrants

Figure 15: Changes in foreign entrant employment shares for foreign entrants by source country and BTA tariff cuts, 2000-2017

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2). The foreign entrant is defined as based on the FDI source country. The base year is 2000 and the observations are weighted by 2000 employment. The analysis is conducted at the 4-digit industry level. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

and from non-U.S. affiliated firms (i.e non-related party trade). The non-U.S. affiliated firms make up the majority of Vietnamese exports to the U.S. from 2000-2011. In 2000, non-U.S. affiliated firms account for 96.2% of exports while U.S. affiliates account for only 3.8%. By 2011, the share of exports by non-U.S. affiliates decreases slightly to 83.1% while U.S. affiliates account for 16.9% (13.3 and 2.7 billion dollars respectively, Appendix Figure D7). This is consistent with low employment shares in U.S.-owned firms throughout the period (Figure 4).<sup>69</sup> Figures 16b and 16c examine the tariff cut effects on Vietnamese exports to the U.S. from Figure 5 by estimating equation (1) separately for exports by U.S. and non-U.S. affiliates. While lower tariffs are associated with increased exports for both affiliated and non-affiliated firms, the coefficients on tariffs in the affiliated firms sample tend to be smaller in magnitude and are less precise. The coefficients on tariffs from firms that are not affiliated with U.S. multinationals are always statistically significant and larger in magnitude over time (Figure 16c). The 2017 coefficient for exports by non-U.S. affiliates is 19.3, implying that they are 4.6 ln points larger in an industry that received the average tariff reduction compared to no reduction (Figure 16c). Importantly, the magnitudes in Figure 16c are very similar to those for total Vietnamese exports to the U.S.,

<sup>69</sup>The lack of firm-level export destination data precludes us from quantifying the exact contribution of non-U.S. foreign firms (relative to private and state firms) to non-affiliate exports to the U.S.



(a) Shares by U.S. and non-U.S.  
Affiliates

(b) U.S. Affiliates

(c) Non-U.S. Affiliates

Figure 16: Vietnam-U.S. exports by U.S. and non-U.S. affiliates and BTA tariffs, 2000-2011

*Note:* Panel (a) reports the share of Vietnamese manufacturing exports to the U.S. by U.S. and non-U.S. affiliates. Exports by U.S. affiliates are also known as Related Party Trade. These are transactions which include any person directly or indirectly owning, controlling, or holding with power to vote,  $\geq 5\%$  of the outstanding voting stock or shares of any organization and such organization (U.S. Census Bureau). In Panels (b) and (c), each point reflects an individual regression coefficient,  $\hat{\beta}_{t'}$ , following equation (1). The analysis is conducted at the 3-digit industry level. In Panel (b), the dependent variable is log Vietnamese exports to the U.S. from U.S. affiliates. In Panel (c), the dependent variable is log Vietnamese exports to the U.S. from non-U.S. affiliates (Non-Related Party Trade). BTA was implemented in Dec 2001, as indicated by the gray line, and the base year is 2000. Controls include 3-digit industry FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and US import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 3-digit industry level. Weighted by year 2000 Vietnamese exports to the world. Source: Antras (2016), UN Comtrade, USITC, World Bank WITS, and authors' calculations.

as shown in Figure 5, consistent with non-related party trade being the majority of exports to the U.S. and driving the overall results. Jointly, these three figures show that most of the increase in BTA-tariff induced exports stem from non-U.S. affiliated trade. Focusing solely on the response of FDI from U.S. multinationals to the BTA-induced tariff cuts would miss much of how foreign affiliates of multinationals respond in terms of entry, employment, and exports when facing lower tariffs on exports to a large destination market.

The most common sources of FDI to Vietnam during this period are Taiwan, South Korea, and Japan. These countries account for the majority of employment in foreign firms before and after the BTA (82% in 1999 and 90% in 2017, Figure 4 in Section 2). Once the agreement reduced the tariffs on Vietnam's exports to a key export destination, Vietnam became a more attractive production location and foreign affiliates from geographically closer countries with existing regional supply chain linkages might have been better positioned to respond to the tariff cuts (see, for example Head and Mayer (2019), Antràs et al. (2022)). Our findings are related to a growing literature examining third-party effects of changes in bilateral trade policy. This literature often focuses on multinationals from one source country (e.g., U.S.-based multinationals in Garett et al. (2024) and Antràs et al. (2022)) or on one industry (e.g., cars in Head and Mayer (2019) and washing machines in Flaaen, Hortaçsu and Tintelnot (2020)). We provide complementary anal-

ysis focused on one low-income country production location, with FDI from all source countries, across all manufacturing industries. We show that the third-party effects are prevalent throughout manufacturing. Furthermore, the effects are not just limited to the signing parties—Vietnam and the U.S. in this case—as they are largely accounted for by foreign entrants from other countries, mainly Japan, South Korea, and Taiwan, highlighting the importance of studying foreign affiliates from all countries, not just one source country.

**Tariff cuts induce export growth to other countries in the long run** The U.S. tariff reductions initially led to increases in Vietnamese exports to the U.S. in industries with bigger tariff cuts. However, over time, Vietnamese exports to the rest of the world also increase in these same industries—highlighting the longer-term effects of trade policy and the potential for bilateral changes in trade policy to affect other countries (see Fajgelbaum et al. (2021) for evidence of changes in trade between other countries due to the U.S.-China trade war).

Figures 17a and 17b examine the tariff cut effects on Vietnamese exports to the world by estimating equation (1) separately for total world exports and world exports excluding the U.S. The tariff coefficients on Vietnamese total exports to the world were initially small and statistically insignificant, but consistently increasing in magnitude. However, about 10 years after the BTA the coefficients start to become statistically significant, such that Vietnam's exports to the world grew by about 0.96 ln points or 161% in response to the mean U.S. tariff cuts by 2017 (Figure 17a). Without the U.S., the tariff coefficients are generally flat until 2008 and then start increasing. By 2017 Vietnam's exports to the world without the U.S. grew by about 0.72 ln points (105%) in response to the average U.S. tariff cut.<sup>70</sup> These results are consistent with foreign entrants exporting a high percentage of their output, 80-85%, (Figure B10) and to multiple countries (Figure B9), suggesting that long run employment growth in foreign entrants was primarily due to exporting.

While this is beyond the scope of the current paper, these results are consistent with the presence of scale spillovers to other markets. As Vietnam became a more viable production location and better integrated into global value chains due to the BTA, the expansion of exports to other markets may be what sustained the long run, continued expansion of employment in

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<sup>70</sup>We have explored the robustness of these results to successively removing Vietnam's largest export markets and by successively removing Vietnam's largest export industries as of 2017. The general pattern is quite similar. This suggests that the expansion of exports to other countries in relation to the U.S. tariff reductions starting around 2009 is a broad-based multi-country, multi-industry expansion. Results available upon request.

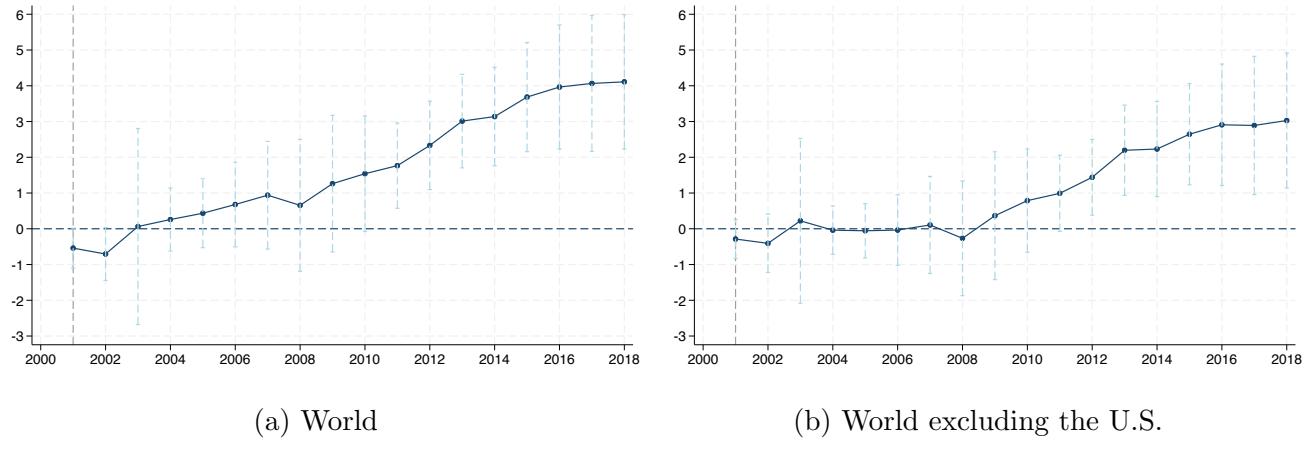


Figure 17: Vietnamese exports to the world including and excluding the U.S. and BTA tariffs, 2000-2018

*Note:* Each point reflects an individual regression coefficient,  $\beta_{t'}$ , following equation (1). In Panel (a), the dependent variable is log Vietnamese exports to the world in an industry. In Panel (b), the dependent variable is Vietnamese exports to the world in an industry excluding the U.S. BTA was implemented in 2001, as indicated by the gray line, and the base year is 2000. The analysis is conducted at the 3-digit industry level. Controls include 3-digit industry FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the US in year  $t$ , and US import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 3-digit industry level. Weighted by year 2000 Vietnamese exports to the world. Refined petroleum is excluded. Source: BACI, USITC, World Bank WITS, and authors' calculations.

foreign firms (Figure 8a), especially post-entry employment in entrants (Figure 13), after exports to the U.S. ceased growing in response to the U.S. tariff reductions (Figure 5).<sup>71</sup>

Overall, this section provides evidence that our main results—the entry and subsequent employment growth in foreign entrants in response to tariff-induced export opportunities—are driven by foreign entrants who are also exporters and who came predominantly from East Asia, not the U.S. This highlights that the economic opportunities as a result of bilateral trade agreements are not solely limited to just the signing parties (Vietnam and U.S.). Third, over the long run, we show that the U.S. tariff reductions are associated with growth in exports to other markets, possibly contributing to the long run expansion of employment.

## 7 Conclusion

Recent changes in bilateral trade policy, most importantly the U.S.-China trade war, have thrust Vietnam into the international spotlight, with many claiming Vietnam was one of the biggest beneficiaries of the trade war (see Fajgelbaum et al. (2021) and Alfaro and Chor (2023) as well as popular press such as Davis and Wei (2022) and Jamrisko (2019)). To understand how Vietnam

<sup>71</sup>The timing is also consistent with China's export slowdown (Brandt and Lim, 2024).

succeeded, it is important to understand the long run changes that allowed Vietnam to already be a major exporter and host country for export-oriented foreign investment prior to the trade war. The 2001 U.S.-Vietnam Bilateral Trade Agreement was a critical step for this development as the mandated reduction in U.S. tariffs on Vietnamese exports opened up the world's largest export market to Vietnam.

Our study focuses on the long run employment effects of new export opportunities. Our results show that employment in formal manufacturing grew faster in industries that experienced the largest U.S. tariff reductions and that this effect continued to grow up to 15 years after the BTA came into effect, highlighting the importance of long run analysis. The employment growth was primarily from foreign affiliates entering Vietnam to export.<sup>72</sup> While private domestic firms are also more likely to enter industries that received large tariff reductions, they do not contribute to overall employment growth. This is consistent with the lack of growth of domestic firms in development literature and the question remains as to why these private domestic firms enter small and do not subsequently grow, on average, and whether this is largely due to trade-related frictions or to market forces.

Entry of foreign firms continues to grow in response to the U.S. tariff reductions up to 10 years after implementation. Moreover, employment growth after entry is a striking feature of the new foreign affiliates established in Vietnam. About half of the tariff-induced growth in employment share among foreign entrants is due to employment growth after entry, which takes substantial time to materialize. Shorter-term analysis would have missed the longer-term cumulative effects of trade policy. The dynamics of how multinationals adjust production locations across countries over time and post-entry employment growth of export-oriented foreign affiliates is a fruitful area for further research to better understand the mechanisms behind the prolonged employment growth.

Finally, most of this employment growth stems primarily from trade not related to U.S. multinationals. Focusing solely on the response of foreign affiliates from U.S. multinationals to BTA-induced tariff cuts would have missed much of how foreign multinationals, primarily from East Asia, responded to export opportunities from Vietnam. These results highlight that the opportunities created by bilateral agreements are not just limited to signing parties, as well as the importance of studying FDI from several sources in a lower-income host country setting. Disentangling the exact channels of why multinationals from East Asia responded to the U.S. tariff

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<sup>72</sup>See Méndez-Chacón and Van Patten (2022) for a recent example of the historical development consequences of FDI.

reductions remains a useful agenda for future research.

Our analysis shows that from the perspective of a lower-income host country, the employment growth due to FDI entry is not just a source of capital and exports, but also a source of formal sector jobs. There are several possible factors for explaining the large employment response in Vietnam. These includes Vietnam's close geographic proximity to existing global values chains centered in East and Southeast Asia, a well-educated and young workforce (McCaig and Pavcnik, 2017) who tend to be geographically mobile (McCaig, 2011; McCaig, Nguyen and Kaestner, 2022), openness to foreign direct investment in manufacturing prior to the BTA, and a comparative advantage in labor-intensive manufacturing goods.

Our findings may apply to other countries which historically also relied heavily on foreign affiliates for producing manufacturing exports, such as China and Thailand, at earlier points on their industrialization paths.<sup>73</sup> Moreover, as global supply chains are reshaped due to the U.S.-China trade war, the entry and expansion of foreign affiliates in countries other than China may be inducing similar employment effects.

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<sup>73</sup>Foreign firms accounted for 60% of Chinese manufacturing exports in 2005 (Morrison, 2019) and 59% of manufacturing exports from Thailand in 1996 (Jongwanich and Kohpaiboon, 2008).

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# Part

# Online Appendix

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# A Data Appendix

In this appendix we provide additional details on the enterprise data. Specifically, we describe (1) the sampling framework, (2) consistency of our key variables over time, (3) creation of consistent ownership codes over time, (4) steps taken to clean and prepare the data for analysis, (5) and corrections made to the panel of firms, particularly between 2000 and 2001, but also for other years. One of the contributions of our analysis is that we devoted significant effort working with the GSO to verify the matching of enterprises over time in the data.<sup>1</sup>

## A.1 Sampling framework

We use annual data on enterprises collected by the General Statistics Office (GSO) of Vietnam for the years 2000 through 2017. The survey covers all businesses registered as an enterprise under Vietnam’s Enterprise Law.<sup>2</sup> All state-owned, foreign-invested, and collective businesses must legally register as an enterprise, but private businesses may legally operate either as an enterprise or as a household business.<sup>3</sup> Private businesses must register as an enterprise if they have more than ten workers or operate in more than one location.<sup>4</sup> Thus, although registration as an enterprise is not required for small, private businesses, some of those businesses nonetheless register as enterprises and are included in the sample.

Starting with the survey covering the 2003 calendar year, the GSO split the population of enterprises into two groups: those that receive the full length questionnaire and those that receive a shorter questionnaire. All state enterprises, foreign enterprises, collectives and large private enterprises continued to receive the full length questionnaire. A subset of small private enterprises received the complete questionnaire and the remaining small private enterprises received the short questionnaire. The short questionnaire consistently collected information on ownership, industry, employment, and unique firm identifiers, the most important variables in our analysis.

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<sup>1</sup>We are very thankful to Hanh Nguyen for careful translation of the Enterprise Survey Plans for surveys used in our analysis.

<sup>2</sup>See law No. 13-1999-QH10.

<sup>3</sup>Household businesses operate under a different legal framework than enterprises. For example, they are not required to follow formal accounting rules nor to provide social insurance contributions on behalf of their workers. Thus, they are usually considered as informal businesses relative to enterprises. See Malesky and Taussig (2009), McCaig and Pavcnik (2018), and McCaig and Pavcnik (2021) for further discussion on differences between enterprises and household businesses.

<sup>4</sup>See decrees No. 02/2000/ND-CP of 3 February 2000 and No. 109/2004/ND-CP of 2 April, which describe household business and enterprise registration requirements during our study period for private businesses.

## A.2 Consistency of main variables over time

The most important variables for our analysis are employment, industry, and ownership. All questionnaires, both the full length and the short versions for listed enterprises, consistently ask about end of year employment in the enterprise. Hence, this variable is consistently asked of all enterprises in all years.

**Industry:** The industry of affiliation is reported using two different industry classifications, which we concord at a 4-digit level to obtain a consistent industry classification over time. For years 2000 through 2010 it is reported according to the 1993 version of the Vietnam Standard Industrial Classification (VSIC). The classification is closely based on revision 3 of the International Standard Industrial Classification (ISIC). Within manufacturing, they are identical. We use the 4-digit codes. In some surveys, it appears as though some ad hoc refinement was introduced in the codes. For example, according to both VSIC 1993 and ISIC revision 3, code 1810 is for "wearing apparel, except for fur apparel," with no disaggregation at the 4-digit level relative to the 3-digit level code 181. However, sometimes we observe disaggregation such as 1811 and 1819. In cases like these we replace the invalid codes with the correct associated 4-digit code.

From 2007 through 2017, the industry codes are based on the 2007 version of VSIC, which is based on revision 4 of ISIC. Again, within manufacturing they are identical. We convert the 4-digit 2007 VSIC codes to 4-digit 1993 VSIC codes in two steps. First, we use the official concordance from ISIC revision 4 to revision 3. Second, in instances in which one 4-digit VSIC 2007 code matches with more than one 4-digit VSIC 1993 code, we make use of the years 2007 through 2010 in which both codes are reported. We match the 4-digit VSIC 2007 code with the most commonly matched 4-digit VSIC 1993 code in these overlapping years.

**Ownership:** Firm ownership is described using 12 to 14 detailed ownership codes. We group these ownership codes into three broad ownership categories: state, private domestic, and foreign. The detailed ownership codes have changed slightly over time, but can consistently be aggregated into the three broad categories.<sup>5</sup> We consistently define *state* as encompassing central SOEs, local SOEs, state limited liability companies, and joint stock and limited liability companies with >50% state capital. We define *private domestic* as encompassing private limited liability companies, collectives, private enterprises, partnerships, joint stock companies without state capital, and joint

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<sup>5</sup>The data we received from the GSO for 2000 and 2001 reported the detailed ownership codes according to the codes and descriptions for 2000 and 2001 respectively as well as according to the codes and descriptions for 2002. We use the 2002 detailed codes and descriptions.

stock and limited liability companies with  $\leq 50\%$  state capital. We define *foreign* as encompassing 100% foreign owned and joint ventures with either state or domestic private firms.

### A.3 Removing 2002 entrants from the 2001 data

The 2002 survey, which collected data about firm performance in 2001, also included questions about performance in the first six months of 2002. As such, the survey includes some firms that did not operate as an enterprise in 2001, but only began operating as an enterprise in the first six months of 2002.

There were originally 56,551 firms in this survey. Of these, 5,438 report 0 or missing employment at both the start and end of 2001. Most of these firms reported being established in 2002 (84.3%) or 2001 (14.1%). Note that the year of establishment is not necessarily the same as the year that the firm registered as an enterprise or began operations. We drop these firms from the 2001 dataset.

### A.4 Verifying the panel

The data allows us to track enterprises over time using a unique identifier (the variable *madn*).<sup>6</sup> In this section, we discuss various checks we performed on the panel, further validating our definition of firm entry and exit.

**Non-unique enterprise identifiers:** Between 2000 and 2010, the number of non-unique enterprise identifiers within a year was small. We visually inspected all of these instances and manually changed the identifier to either a completely new identifier value or to match the value of another enterprise if applicable. From 2011 onward, the number of non-unique enterprise identifiers grew significantly and we implemented the following procedure to identify unique enterprises. First, a significant number of non-unique identifiers were due to a data entry error, whereby an entire observation was entered more than once in a given year. In these instances, we drop all but one observation per enterprise per year. Second, many of the non-unique identifiers occur in enterprises that have different taxcode ids. We therefore use the enterprise taxcode id and

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<sup>6</sup>We can alternatively match enterprises using their reported taxcode (*ma\_thue*), as was done in Baccini, Impulzetti and Malesky (2019). We prefer *madn* because the raw variable includes fewer observations with non-unique or missing values for most years. From 2014 onward, the taxcode includes fewer observations with non-unique values and we at times use this information to improve the matching of enterprises over time. See detailed description below.

location information to assign a unique identifier if the enterprise is an entrant or to match the enterprise over time and thus assign the enterprise identifier used for the same enterprise in previous years. After these procedures, enterprises accounting for no more than 2 percent of manufacturing employment in any year have non-unique identifiers. We drop these observations.

**2000-01 panel:** We use additional confidential data from the GSO to validate the year-to-year firm matches. This only made a significant difference in the definition of entry and exit in 2000-01 panel. Initially, 67.2% of enterprises from 2000 could be matched with enterprises in 2001. In the subsequent years, the year-to-year matches increased substantially to between 81.8% and 85.4%. We used additional confidential data made available to us by the GSO to look for additional potential matches between 2000 and 2001. With this information, an additional 6,557 enterprises are matched between 2000 and 2001 using a matching algorithm based on restrictive criteria described below. This increases the percentage of 2000 enterprises matched with 2001 enterprises from 67.2 to 82.9. The importance of this procedure for the 2000-01 panel is potentially not surprising given that the GSO started collecting this data in 2000. We employed the following matching algorithm, with the number of additionally matched enterprises at each step listed in parentheses:

1. Perfectly matched based on province, district, ward, start year, ownership, and tax code (2,032),
2. Perfectly matched based on province, district, ward, start year, ownership, phone number, and owner's name (1,358),
3. Perfectly matched based on province, district, ward, ownership, phone number, and owner's name (908),
4. Perfectly matched based on province, district, ward, and phone number (957),
5. Perfectly matched based on province, district, ownership, phone number, and owner's name (217),
6. Perfectly matched based on province, district, ward, ownership, and owner's name matches within one character (1,085).

We performed this check for all enterprises, regardless of whether they are in manufacturing.

**Visual inspection of entry and exit of all large manufacturing enterprises:** We define enterprise entry and exit based on our ability to track an enterprise over time. However, it is possible that an enterprise was incorrectly assigned a new identifier between two successive years even though it is a continuing enterprise. If so, this would lead to both a false instance of exit and entry. We begin with two examples.

Example #1: A centrally owned SOE in the printing industry (VSIC1993 code 2221) appears to exit after 2000. Another centrally owned SOE in the printing industry appears to enter in 2001. The firms have the same tax code (other than the additional digit all tax codes have in 2000 relative to 2001), are both located in province 101, district 9, ward 29, and have the same address and fax number. The exiting firm has 107 employees and 6138 million Vietnamese Dong (VND) in capital at the end of 2000. The entering firm has 107 employees and 6131 million VND in capital at the start of 2001. Together, we take these similarities as strong evidence that this is the same firm and give it the same firm identifier.

Example #2: A locally owned SOE manufacturing footwear (VSIC1993 code 1920) appears to exit after 2001. A locally owned SOE in wholesale (VSIC1993 code 5190) appears to enter in 2002. The entering firm's secondary industry is footwear manufacturing, while the exiting firm's secondary industry is wholesale (VSIC1993 code 5149). The firms are both located in province 101, district 1, ward 3, and have the same listed start year, address, fax number, phone number, director, and email address. The exiting firm has 563 employees and 13282 million VND in capital at the end of 2001. The entering firm has 570 employees and 13382 million VND in capital at the start of 2002. Together, we take these similarities as strong evidence that this is the same firm and give it the same firm identifier.

We used a combination of visual inspection and algorithms to look for instances of false exit and entry as in the examples above. This procedure also ensures that SOEs that are privatized, including partial privatization, are not coded as an exit nor as an entry during the process of (partial) privatization. The following example is typical of SOEs that appear to exit due to privatization.

Example #3: A centrally owned SOE operating in industry 2912 appears to exit after 2003. A joint stock company with state capital share >50% in industry 2912 appears to enter in 2004. Both firms are in the same ward, have the same address, report the same start year, and report the same value of capital for end of year in 2003 and start of year in 2004. Together, these similarities

suggest that this is the same firm that underwent partial privatization and give it the same firm identifier.

All manufacturing state enterprises that exited or entered between 2000 and 2010 were visually inspected. Due to the larger number of foreign and private enterprises, we prioritized visual inspection based on the largest enterprises in terms of employment. All foreign and private manufacturing enterprises with at least 1000 employees at exit were visually examined. In addition, we developed an algorithm for identifying instances of false exit and entry among smaller foreign and private enterprises using combinations of information on location, taxcode, phone number, and ownership.

**Confirming existing panel enterprises:** We also reviewed existing matches of enterprises over time. In particular, we visually inspected instances where the taxcode changed over time, but the identifier did not. We did this for all enterprises in manufacturing.

**Summary of changes to enterprise identifiers:** In conclusion, we provide a summary in Table A1 of the changes to enterprise identifiers by year, based on all the procedures discussed above. The table focuses on enterprises with manufacturing as their initial industry. We categorize observations by initial ownership as in our main sample used for analysis. In our main analysis, we drop all observations for which the identifier was non-unique after all the data cleaning steps taken. The share of enterprises with a changed firm identifier is higher among state than either private or foreign. This is due to a number of reasons. First, as there was much less entry of state enterprises, any changes due to initial matching mistakes between 2000 and 2001 will persist for a greater share of state enterprises. 32.3% of changes for state enterprises are due to initial mismatches between 2000 and 2001. Second, 21.7% of the state firm identifier changes happen when there was a change in ownership, for example due to (partial) privatization or due to change in ownership within the state sector, such as from 100% central SOE to a state limited liability company. A further 14.5% of changes were due to instances in which the taxcode of the state enterprise changed without any change in ownership. Fourth, 19.2% of the changes occurred when the enterprise was absent in the dataset for a year or more and then reappeared with a new firm identifier despite being observably the same enterprise. Lastly, 12.4% of the changes were due to other reasons.

Table A1: Share of enterprises with a changed identifier

Year	All owners		State		Private		Foreign	
	N. obs.	Changed	N. obs.	Changed	N. obs.	Changed	N. Obs.	Changed
2000	10,112	0.097	1,497	0.124	7,596	0.097	1,019	0.057
2001	11,598	0.015	1,444	0.102	8,850	0.002	1,304	0.005
2002	14,172	0.019	1,445	0.154	11,090	0.003	1,637	0.007
2003	16,153	0.022	1,391	0.206	12,835	0.004	1,927	0.010
2004	19,417	0.024	1,396	0.271	15,764	0.004	2,257	0.010
2005	22,809	0.021	1,376	0.280	18,851	0.004	2,582	0.011
2006	25,408	0.020	1,380	0.285	21,074	0.004	2,954	0.013
2007	29,265	0.019	1,412	0.286	24,427	0.004	3,426	0.015
2008	36,284	0.017	1,405	0.301	31,029	0.004	3,850	0.018
2009	42,627	0.015	1,436	0.304	36,984	0.004	4,207	0.020
2010	45,943	0.015	1,417	0.299	40,098	0.004	4,428	0.021
2011	52,438	0.014	1,426	0.307	46,096	0.004	4,916	0.022
2012	54,711	0.014	1,422	0.306	48,285	0.004	5,004	0.022
2013	56,813	0.013	1,375	0.300	50,077	0.004	5,361	0.023
2014	60,626	0.055	1,344	0.298	53,446	0.051	5,836	0.042
2015	64,846	0.055	1,349	0.300	57,175	0.050	6,322	0.044
2016	71,431	0.043	1,281	0.295	63,120	0.039	7,030	0.040
2017	79,565	0.037	1,311	0.281	70,511	0.033	7,743	0.035
Total	714,221	0.029	25,107	0.260	617,310	0.020	71,804	0.026

*Notes:* The sample of enterprises is those operating in manufacturing in their first year in the dataset. Ownership is based on the enterprise's reported ownership in its first year in the dataset. Source: Vietnam GSO and authors' calculations.

## B Additional Background

We provide further background information including (i) aggregate firm entry and exit, (ii) Vietnam's major export markets and industries, (iii) the importance of foreign firms for exports and their linkages with domestic firms, (iv) other trade policy changes during our period of analysis, (v) the Vietnamese government's reform policy on state-owned firms, (vi) financial incentives for foreign firms, and (vii) long run employment changes by industry and ownership.

First, we report the average U.S. tariff cuts across 2-digit industries in Figure B1, sorted by their pre-BTA year 2000 employment size. This figure, for visualization purposes only since our analysis is done at the more disaggregated 3- and 4-digit levels, shows a lack of any systematic relationship between tariff cuts and initial industry employment. Similarly, Figure B2 repeats this exercise ranking industry employment by foreign and domestic firms respectively. These figures also show a lack of a systematic relationship between the size of the U.S. tariff reductions and industry employment size among foreign and domestic firms.

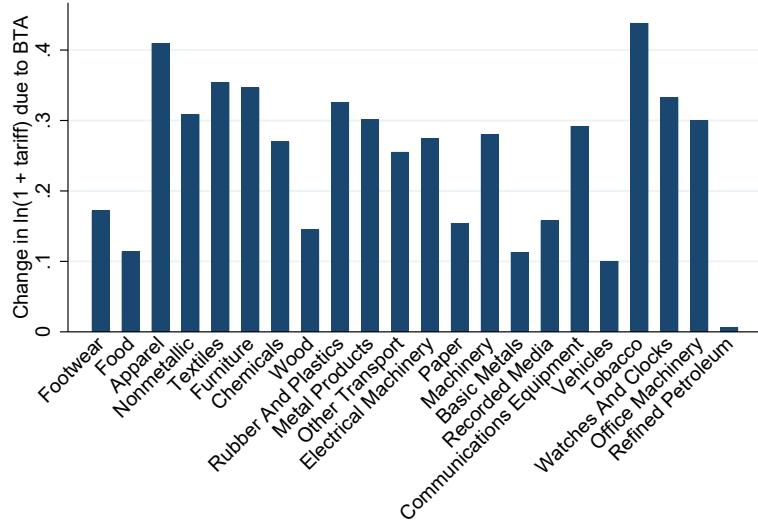
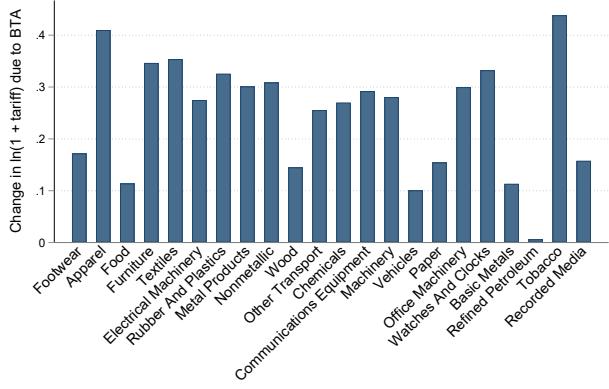


Figure B1: Tariff reductions due to the BTA

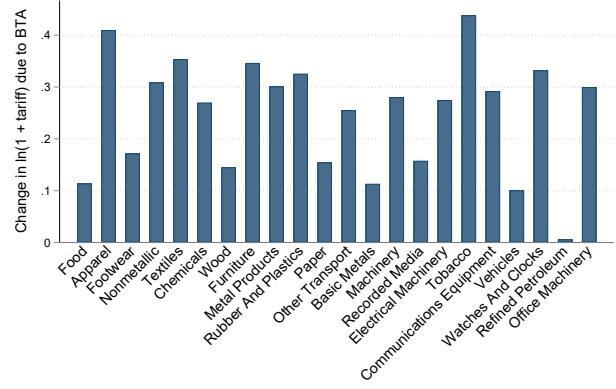
*Note:* 2-digit manufacturing industries are sorted by total employment in year 2000 (largest on the left and smallest on the right). Our subsequent analysis in this paper is at more disaggregated 3- and 4-digit levels. Source: US International Trade Commission, World Bank WITS, General Statistics Office of Vietnam, and authors' calculations.

### B.1 Firm entry and exit

Firm entry and exit were important margins of adjustment from 2000 to 2017. Table B1 reports the importance of entry and exit in the formal manufacturing sector for all firms and for state,



(a) Foreign



(b) Domestic

Figure B2: Tariff reductions due to the BTA and initial industry employment in foreign and domestic firms

*Note:* 2-digit manufacturing industries are sorted by total employment in year 2000 (largest on the left and smallest on the right). In panel (a) industries are sorted based on employment in foreign firms. In panel (b) industries are sorted based on employment in domestic firms. Source: US International Trade Commission, World Bank WITS, General Statistics Office of Vietnam, and authors' calculations.

foreign, and private firms. In this table, exiting firms are defined as firms that operated in 2000, but not in 2017. Entrants are firms that operated in 2017, but not in 2000. 68 percent of firms that operated in 2000 exited by 2017, while 96 percent of firms in 2017 were not in operation in 2000. Exiters and entrants account for a sizable share of employment and revenue, with entrants accounting for 81 percent of employment and 81 percent of revenue in 2017. In addition, entry and exit rates differ widely across ownership. Private domestic firms exhibit the highest entry and exit rates, 98 and 78 percent respectively. Foreign firms have notably higher entry rates, 92 vs. 27 percent, and similar exit rates, 41 vs. 36 percent, compared to state firms.

### B.1.1 Entry or formalization of informal private domestic firms?

In this section we provide further discussion of an important issue related to entry in our dataset, namely whether private entry is being driven by previously informal firms registering as an enterprise. It is possible that some of the private domestic entrants are simply entrants into the enterprise sector and had previously been operating not as an enterprise, but as an individual business (we refer to these as informal household businesses). As discussed in section 3, not all private domestic firms are required to register to operate. Consequently, some of the entry into the enterprise sector could reflect formalization.

How much is this an issue in our data? Importantly, this does not influence the definition of

Table B1: Entry and Exit of Firms between 2000 and 2017

Share of	Firms	Revenue	Employment
All ownership types			
Exiters	0.68	0.31	0.35
Entrants	0.96	0.81	0.81
Foreign affiliates			
Exiters	0.41	0.24	0.24
Entrants	0.92	0.84	0.86
Private domestic firms			
Exiters	0.78	0.58	0.56
Entrants	0.98	0.88	0.87
State-owned firms			
Exiters	0.36	0.25	0.26
Entrants	0.27	0.32	0.24

*Note:* Existing firms are defined as firms that operated in 2000, but not in 2017. Entrants are defined as firms that operated in 2017, but not in 2000. For the exiters, we report the share of firms, revenue, and employment in 2000 accounted for by firms that will exit by 2017 (for example, 68 percent of firms that operated in 2000 exited by 2017). For the entrants, we report the share of firms, revenue, and employment in 2017 accounted for by firms that were operating in 2017 but were not operating in 2000 (for example, 96 percent of firms in 2017 were not in operation in 2000). Source: Vietnam GSO and authors' calculations.

entry for foreign and state firms because all such firms are required to register as an enterprise. Formalization among informal businesses in Vietnam, like in other countries, is rare. Using a panel dataset on informal businesses, McCaig and Pavcnik (2021) find only 1.5 to 2% of informal businesses formalized in the period 2006-08 to 2016-18 conditional on survival between successive surveys (two years apart). Using the same dataset, formalization among manufacturing businesses varied between 0.8 and 1.5%. To the extent that some of the private entry is driven by formalization of previously informal firms, this changes the interpretation of entry to entail newly created domestic enterprises and newly registered firms that previously operated as a non-registered (i.e. informal) business. Both of these concepts are of interest as there is a large literature in development economics that examines the determinants of formalization or creation of formal jobs.

The annual enterprise data does not provide information on whether a private domestic business previously operated as an informal business. We rely on other evidence to evaluate this option for interpretation of entry for private domestic firms.

First, Malesky and Taussig (2009) find that most newly registered private enterprises spent very little time in the informal sector. They examine the likelihood of a registered private domestic enterprise having started as an informal business using a survey conducted as part of the

2007 Provincial Competitiveness Index survey.<sup>7</sup> 40% of the firms report starting directly in the registered sector. While they find that around 60% of the surveyed private enterprises started as an informal business, most newly registered private enterprises that started as informal spend very little time in informality. In particular, firms established in 2000 spend on average 3 months in informality between establishment and registration, while the firms established in 2001 through 2006, spend 1 month or less.<sup>8</sup> Hence, this potentially reflects that these firms always planned to register, but that the process takes some time. This is not the pattern one would expect if most entry into the registered sector would reflect formalization of established informal businesses. Additional estimates are available from the 2009 and 2015 World Bank Enterprise Surveys for Vietnam. Among private manufacturing firms that registered in 2001 or later, 16% reported starting as an informal business.

Second, we examine whether the entry date for a private domestic entrant (as defined above) corresponds to the date at which a firm started operating. This gives us another indication of what share of private domestic firms start directly in the enterprise sector, as the overlap or proximity of those dates suggest that the firm started operating as a registered firm. For some of the years in the annual enterprise survey, we can compare the entry year (as computed above) to a reported start year of the firm.<sup>9</sup> We find that 58% of private domestic entrants report starting the same start year as the year of entry. Data inspection suggests that the GSO may in some cases miss the entry year by one year due to delays in the GSO updating its list of enterprises through communication with the tax office (i.e. the newly established firm is first being surveyed during its first full calendar year of operation instead of during the first calendar year in which it operates). One potential correction is to address entrants that report positive start of year employment in the first year that they appear in the enterprise dataset and simultaneously report starting prior to the year of entry. This data pattern may be consistent with the enterprise beginning operations in the previous year. In these instances, we can take start of year employment in entry year  $t$  as an estimate of end of year employment in year  $t - 1$  and define year  $t - 1$  as the enterprise's start year. With this adjustment, 70% of private domestic enterprises report the same starting year of operation as the adjusted entry year.

Overall, this discussion suggests that most of the private domestic firms in the enterprise sector

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<sup>7</sup>This survey uses registered firms as the sampling framework.

<sup>8</sup>Note that this is for businesses in all sectors, not just manufacturing.

<sup>9</sup>Information on the start year is available in 2002, 2005, 2007-10, 2012-13, and 2017.

did not start as informal firms and that some of those that did were only shortly in the informal sector (1 to 3 months). This is not the pattern one would expect if most entry into the registered sector would reflect formalization of established informal businesses.

### B.1.2 Mean and median employment entry size

In this section, we provide further details on employment entry size by ownership and make comparisons to entry employment sizes of private domestic firms from other datasets within Vietnam and from other countries.

Median entry size of private firms was 15 in 2001 and dropped to about 5 later in the sample. Mean entry size was 45 at the start of the sample, dropping to 15 by the end. Note that these sizes are substantially smaller than those of foreign and state entrants, with median entry sizes of around 200 and 50, respectively.

Based on the discussion in section B.1.1, the private entrants may be influenced by businesses that are registering as an enterprise after initially spending time as an informal business. We check how much this might influence employment size at entry by restricting the sample of entrants to those that report the exact same start year as the first year that the enterprise first appears in the enterprise data. The mean and median employment for private entrants restricted to those that report starting in the same year as they first appear in the enterprise data is very similar.

We also provide evidence on employment at entry in private firms for Vietnam and Bangladesh, Cambodia, China, and Indonesia using data from the World Bank Enterprise Surveys in Table B2. The estimates show two things. First, the estimates for Vietnam are comparable to our estimates derived from the Vietnamese enterprise data, albeit larger in the WBES data. Second, the WBES estimates for Vietnam are similar to those for other nearby countries that similarly have a large number of export-oriented firms in manufacturing.

Lastly, for comparison purposes, we provide estimates of employment at entry for China and Indonesia from their firm data for private domestic firms. Estimates provided by Krisztina Kis-Katos suggest that the average employment at entry for private entrants in Indonesia's formal manufacturing sector varied over the period 2002 to 2014 from a low of 54 to a high of 271 workers on average. Note that the Indonesian manufacturing survey has an employment cutoff of 20 workers for inclusion in the survey. Estimates using Chinese data provided by Feicheng Wang suggest private sector manufacturing entrants had 32 workers on average (median 16) in the 2004

Table B2: Employment at entry for private firms

Country	No. obs.	Mean	Median
Bangladesh	739	106	20
Cambodia	173	40	5
China	1255	34	11
Indonesia	687	26	8
Vietnam	1003	44	14

*Note:* The estimates are from various World Bank Enterprise Surveys: 2013 for Bangladesh, 2007, 2013 and 2016 for Cambodia, 2012 for China, 2015 for Indonesia, and for 2009 and 2015 for Vietnam. Source: Vietnam GSO and authors' calculations.

entry cohort covered by the 2004 economic census. Estimates from the industrial survey, which has a minimum capital threshold of 5 million RMB for inclusion, suggest mean employment at entry varied from 96 to 198 workers across the 1998 through 2007 entry cohorts.

## B.2 Overall patterns of exports

This section overviews Vietnam's major export markets and industries and highlights the quick ascent of the US as a key destination for Vietnam's manufacturing exports in the aftermath of the BTA. This discussion informs our choices of the falsification and specification checks to rule out spurious correlation between U.S. tariff cuts and demand or supply shocks.

Figure B3a reports the share of Vietnam's manufacturing exports by major markets, which in total account for 74 to 84% of Vietnam's manufacturing exports from 2000 to 2017. Several interesting facts emerge. First, prior to the BTA in 2000, Vietnam's most important export markets for manufacturing were the EU, Japan, and ASEAN, accounting for 28%, 21%, and 15% of total manufacturing exports respectively.<sup>10</sup> The US accounted for only 5% of Vietnam's manufacturing exports in 2000. Second, after the implementation of the BTA in 2001, the US rapidly increased in importance to 24% of Vietnam's manufacturing exports by 2003, overcoming the EU in 2005 to became the leading export market for the rest of the sample period. This rise in relative importance of the US as an export destination occurred during a period of overall export expansion, as indicated in Figures B3b and B3c. Figure B3b highlights the disproportionate expansion of exports to the US in the short to medium run aftermath of the BTA, in comparison to other high-income export markets such as the EU or countries that are major source of FDI

<sup>10</sup>We use the EU15 for a consistent definition of EU countries before and after the BTA. ASEAN consists of Brunei, Cambodia, Indonesia, Lao, Malaysia, Myanmar, Philippines, Singapore, and Thailand.

(Japan, South Korea). Figure B3c, which reports absolute exports by major destinations from 2000 to 2017, highlights the key role of the US as an export destination throughout our period. Third, for most of our period, China is a substantially smaller export destination than the US, EU and Japan, especially from 2000 to 2010. China accounted for less than 5% of Vietnamese exports until 2010, passing 10% in 2016, then quickly increasing its presence to the third largest export destination between 2016 and 2017.

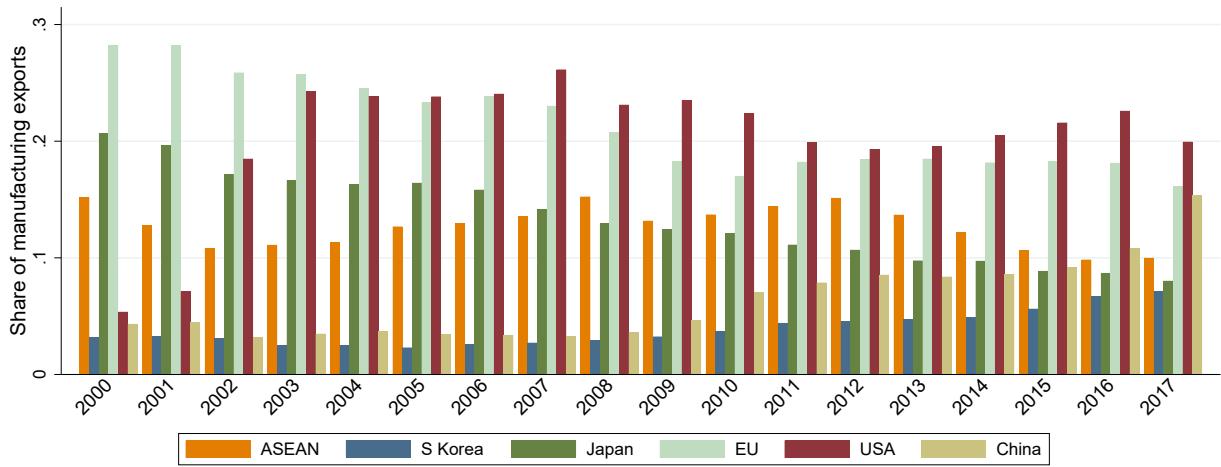
The information on major trading partners, along with the information on the sources of FDI, informs our falsification and robustness analysis discussed in Section 4.<sup>11</sup> Those results show that the first-order effects of the U.S. tariff reductions on Vietnam's exports to the US are not driven by spurious correlation of U.S. tariff cuts and potential contemporaneous supply and demand shocks affecting Vietnamese industries in world markets. As we discuss in section 4.2, we find no statistically significant correlation of U.S. tariff cuts with trade flows to the EU, nor major export markets in East Asia that also serve as sources of FDI to Vietnam (Japan, South Korea, Hong Kong, and China) prior to the implementation of the agreement, nor in the immediate aftermath of the agreement (Figures 6a and 6b).<sup>12</sup> These results provide further evidence that our results are not driven by spurious correlation of supply and demand shocks with U.S. tariff reductions prior to or right after the agreement's implementation.

Our main findings on the effects of BTA-induced tariff cuts on exports to the U.S. are not driven by a particular industry. Figure B4 reports the share of Vietnam's manufacturing exports by two-digit industry. In 2000, Vietnam's manufacturing exports were concentrated in food and beverages (27.0%), garments (19.2%), and footwear (18.6%). The composition of exports by industry changed between 2000 and 2017. By 2017, each of these three industries had become less important (7.7, 10.0, and 9.4% respectively) while communications equipment (e.g., smartphones), 23.5%, and machinery and equipment, 10.2%, became relatively more important. Hence, the growth in manufacturing exports during this period is not simply a story of textiles, garments, and footwear.

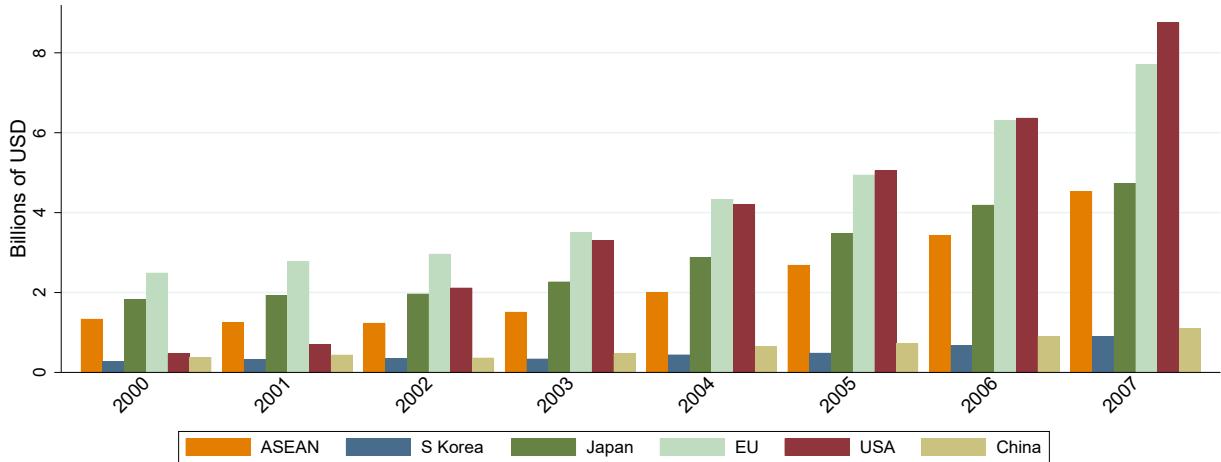
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<sup>11</sup>There is limited availability of Vietnam-ASEAN bilateral trade flows prior to 2001.

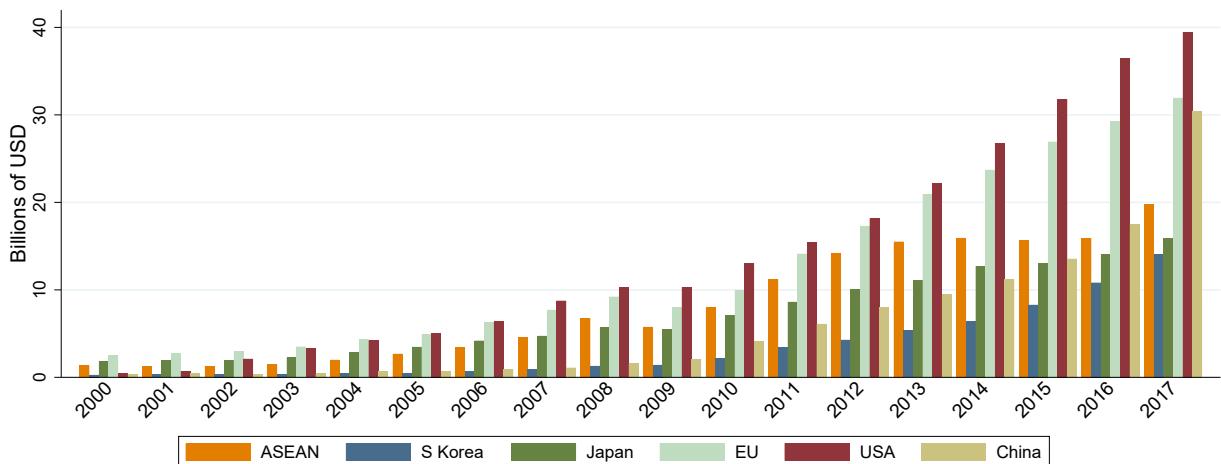
<sup>12</sup>Taiwan, while a major source of FDI capital to Vietnam is not an important export destination. According to Vietnam Customs Handbook (2017), it accounts for 1.2% percent of exports in 2017.



(a) Share



(b) Value, 2000 to 2007



(c) Value, 2000 to 2017

Figure B3: Vietnam's manufacturing exports by major market

*Note:* The data is from UN Comtrade and is based on Vietnam's reported exports at the 6-digit HS level. The HS data was converted to 4-digit ISIC industries using concordances from World Integrated Trade Solutions (WITS) and manufacturing is based on ISIC nomenclature. Source: UN Comtrade, World Bank WITS, and authors' calculations.

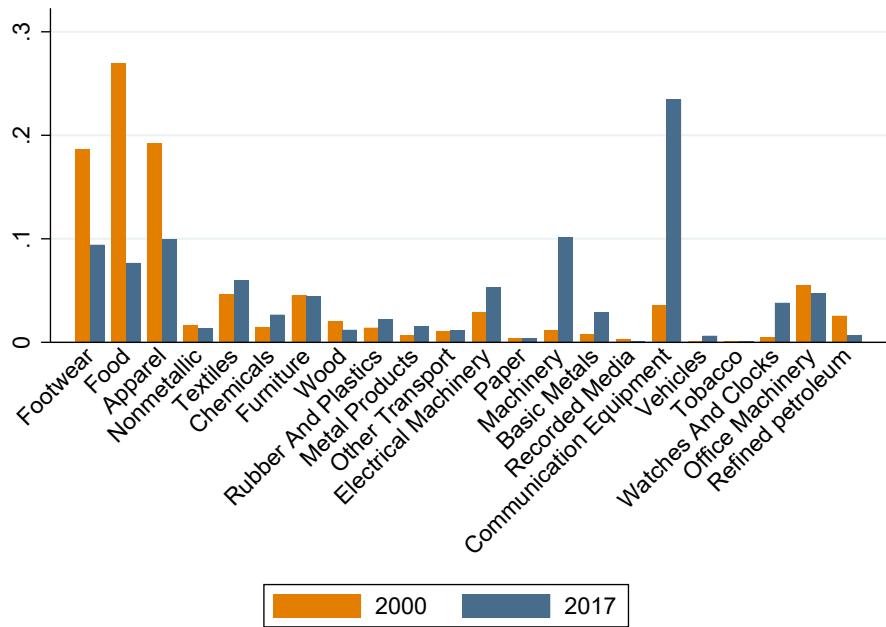


Figure B4: Share of Vietnam's manufacturing exports by industry

*Note:* The data is from UN Comtrade and is based on Vietnam's reported exports at the 6-digit HS level. The HS data was converted to 4-digit ISIC industries using concordances from World Integrated Trade Solutions (WITS) and manufacturing is based on ISIC nomenclature. The reported industries are based on 2-digit ISIC revision 3. Industries are sorted by total employment in 2000 (largest on the left and smallest on the right). Source: UN Comtrade, World Bank WITS, and authors' calculations.

### B.3 Importance of foreign firms for exports and linkages with domestic firms

In this section, we provide further evidence on the importance of foreign firms for manufacturing exports in Vietnam and discuss the limited degree of linkages between foreign and domestic firms. We show that (1) the share of manufacturing exports produced by foreign firms grew rapidly over time, (2) foreign firms are more likely to export than domestic firms, (3) conditional on exporting, foreign firms export a higher share of output, (4) foreign firms are more likely to start exporting shortly after starting operations, (5) the U.S. is an important export market and most foreign exporters export to more than one destination market from Vietnam, and (6) foreign firms source most of their inputs through imports or from other foreign firms operating in Vietnam.

First, foreign firms have been important producers of exports and their importance has grown during our period. According to Vietnam Customs Handbook (2017), foreign firms accounted for 22.9% of total exports in 2000, their share grew rapidly to 33.3% in 2004, three years after the BTA, and continued to grow to 70.9% by 2017.

Second, foreign firms are more likely to export than state or private firms. Figure B5 reports the share of firms that export (by ownership category) using firm-level information from the annual enterprise surveys.<sup>13</sup> 65-75% of foreign firms are involved in exporting, as compared to 30% of state firms and 5-20% of private firms. The importance of export participation among foreign firms is even more pronounced when taking into account the larger size of exporters than non-exporters.

The greater likelihood of exporting and that exporters tend to be larger implies that a much larger share of workers in foreign firms are employed by exporting firms. Figure B6 shows total employment by year in foreign, state, and private firms where ownership is based on the firm's initial year. Additionally, it shows total employment by ownership in exporting years and reports the share of employment by ownership-year in exporting firms. For foreign firms, the share of workers in exporting firms fluctuates around 0.9. In contrast, it is much lower for state firms, around 0.6, and even lower among private firms, although large private firms show a larger share.

Third, conditional on exporting, foreign firms tend to be more export intensive as measured by exports as a share of firm sales. This analysis is based on the information from the 2009 Vietnam Technology and Competitiveness Survey (VTCS), which surveyed a subsample of about 7,600

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<sup>13</sup>The annual enterprise surveys include information on exporting in 2000, 2002, 2004, and 2010-2015. However, non-response is not uncommon. The years with the lowest non-response rates were 2002 (1.0% for foreign, 5.1% for private, and 7.6% for state) and 2013 (8.2% for foreign, 1.6% for private, and 9.6% for state).

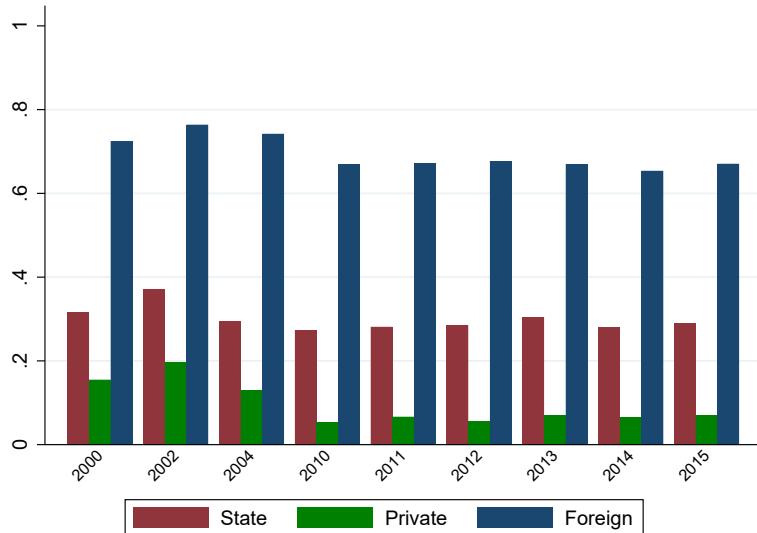


Figure B5: Share of firms that export

*Note:* We assume that firms that do not respond to the question about exporting are non-exporters. This may lead to an underestimate of the number of firms engaged in exporting. The years with the highest share of firms responding to the export participation questions are 2002, 2004, 2013, and 2015. Source: Vietnam GSO and authors' calculations.

firms from the annual enterprise survey.<sup>14</sup> Consistent with the data from the enterprise survey, foreign firms are more likely to export, 72% of foreign firms as compared to 20% of private firms. Figure B7 shows that conditional on exporting, many enterprises are intensive exporters. 66% of foreign exporters export at least 80% of their sales, as compared to 58% of private exporters. When weighted by employment these increase to 80% and 67% for foreign and private exporters respectively.

Fourth, foreign exporters are much more likely to start exporting in the first year of their operation (and within one year of starting) than private firms. To the extent that firms entered a market with the goal of exporting, one would expect them to start exporting soon after they start operating. The VTCS asks when the firm began exporting to its current top three export destinations. Hence, if the enterprise originally started exporting to a different country than is in its current top three markets, we will not observe that start year. To overcome this issue, we focus on firms that reported starting operations in 2001 or later and report in Figure B8 the share of exporters that started exporting in the same year as their start year, within one year, and within two years. Among foreign exporters, almost 60% were exporting in their first year

<sup>14</sup>The survey included 5,925 private and 1,714 foreign enterprises in manufacturing. These enterprises employed about 43% of all workers in private domestic manufacturing and 48% of all workers in foreign manufacturing. The enterprises included in the VTCS were larger on average than those that were not.

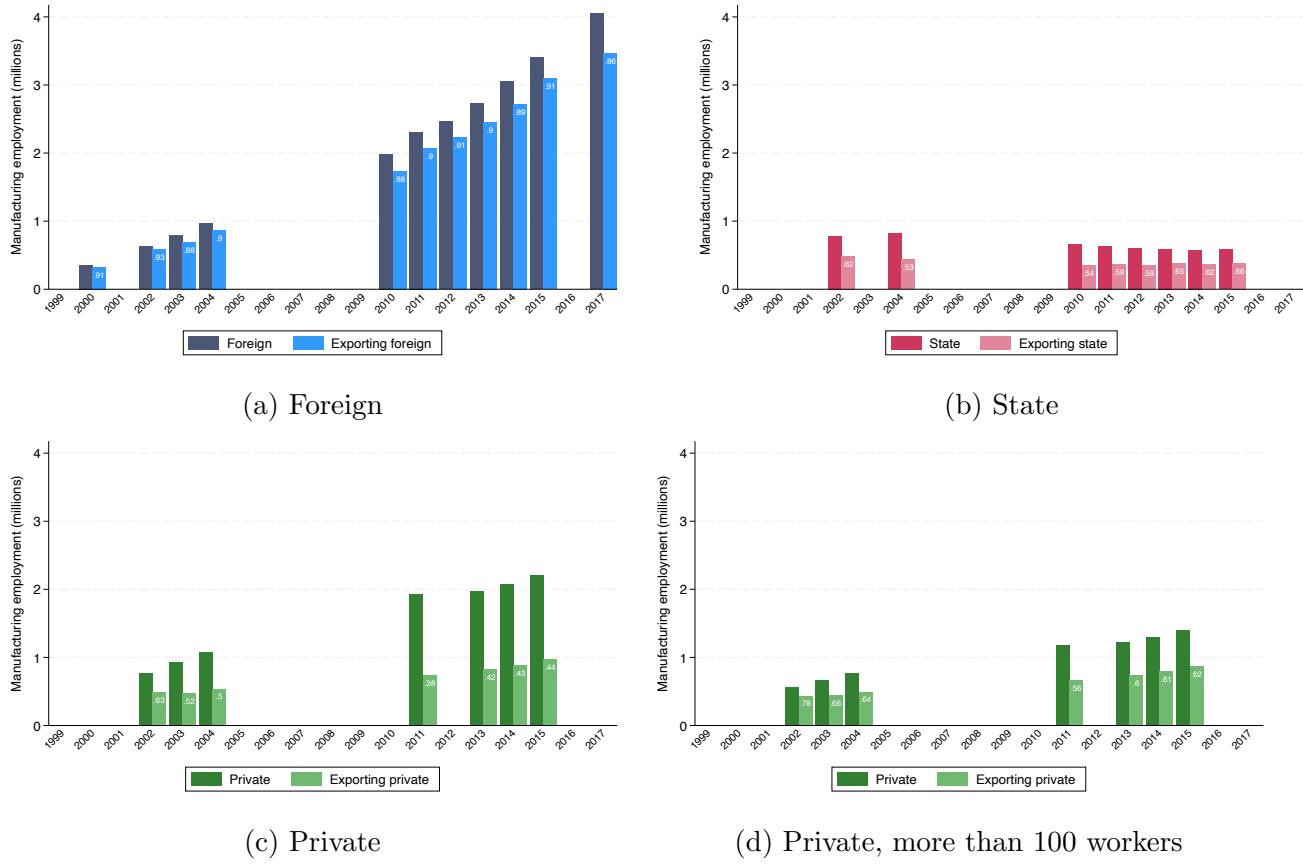


Figure B6: Aggregate employment by ownership and exporting status

*Note:* Each point represents a 4-digit industry. Employment is summed over all firms operating in the industry. The firm's industry and ownership are both based on the initially reported values. Author's analysis based on the Vietnam Enterprise Survey sourced from the GSO Vietnam.

of operation. This increases to 66% when weighting by employment. For private exporters, in contrast, a much lower share were born exporting, only 35 and 39% without and with weighting. Within one year of starting, over 85% of foreign exporters were exporting or 91% when weighted by employment. Hence, a very large share of these exporting firms, particularly foreign, began exporting very quickly.

Fifth, the survey confirms that the U.S. is a key export destination for foreign and private firms. The VTCS asked exporters about their primary and secondary export market. 23% of foreign and 24% of private domestic firms that export list the U.S. as either their primary or secondary export market. The importance of the U.S. as an export destination increases when weighted by employment, with 41% of workers in foreign firms and 38% of workers in private domestic firms that export work in a firm that reports the U.S. as a primary or second export market. Additionally, most workers employed by foreign exporters are in firms that export to more

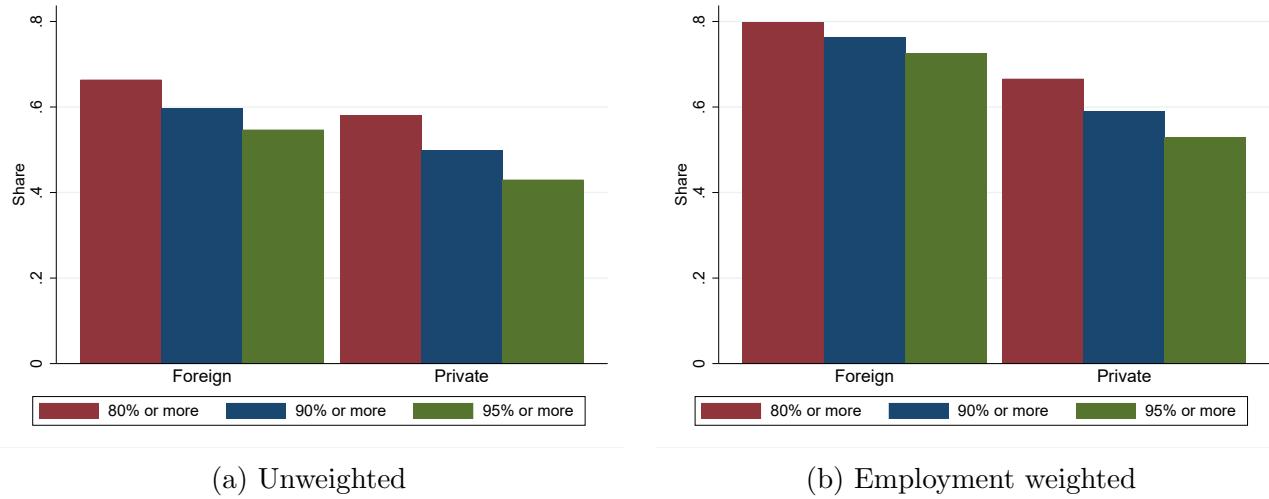


Figure B7: Share of enterprises by export to sales ratio, 2009

*Note:* The data is from the 2010 Vietnam Technology and Competitiveness Survey which was done in conjunction with the 2010 Vietnam enterprise survey and collected information for the 2009 calendar year. The category 80% or more includes firms in the other two categories and the category 90% or more includes firms in the 95% or more category. Source: Vietnam GSO and authors' calculations.

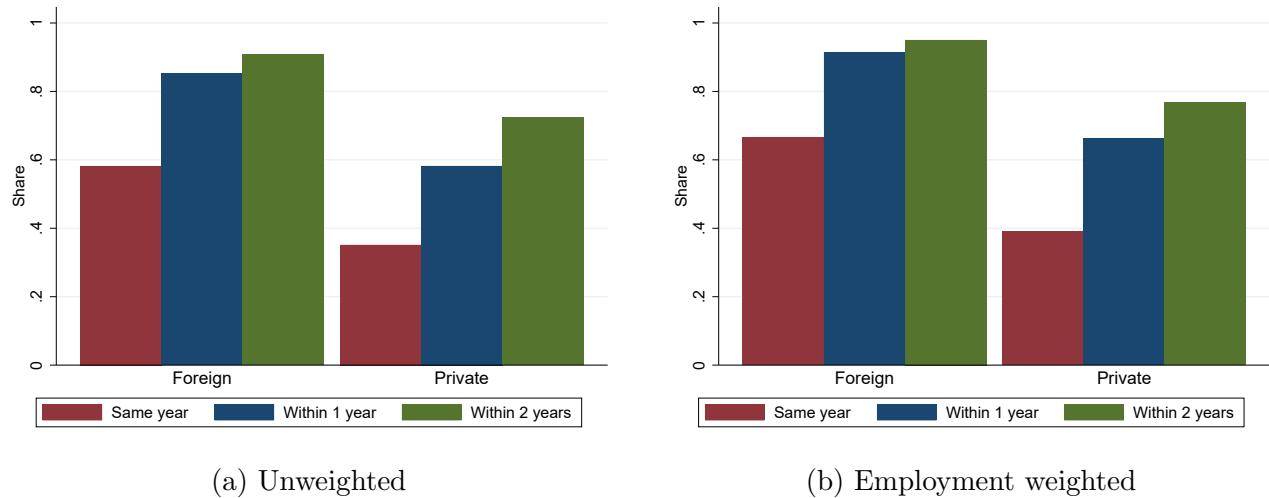


Figure B8: Year that exporting starts relative to start year

*Note:* The data is from the 2010 Vietnam Technology and Competitiveness Survey which was done in conjunction with the 2010 Vietnam enterprise survey and collected information for the 2009 calendar year. The category within 2 years includes firms in the other two categories and the category within 1 year includes firms in the same year category. Source: Vietnam GSO and authors' calculations.

than one country (Figure B9). The VTCS asks exporters to list their top three export markets. About 60% of workers in foreign exporters are in firms that export to 3 or more countries and another 15 to 20% are in firms that export to two countries. This demonstrates that many foreign exporters are using Vietnam to produce exports for multiple markets, consistent with the rise in exports not just to the U.S., but to other markets as well.

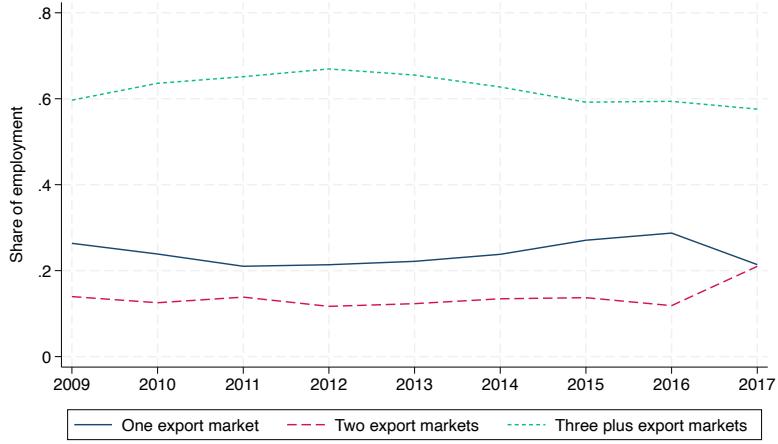


Figure B9: Employment within foreign exporters by number of export markets

*Note:* The data is from the 2009 through 2017 Vietnam Technology and Competitiveness Survey. The sample is all foreign exporting firms sampled in the VTCS in each year. Source: Vietnam GSO and authors' calculations.

Sixth, again using the VTCS, we find that foreign manufacturing firms consistently export a high share of their output (Figure B10). Between 2009 and 2017, the average foreign firm in the VTCS exports about 55% of its output. When weighted by employment it is about 80%. When the sample is restricted to foreign firms that entered after 2000, the estimates are slightly higher. Both series show that foreign manufacturing firms have consistently sold a high share of output as exports, suggesting that exports have been very important for sustaining employment growth in foreign manufacturing firms operating in Vietnam.

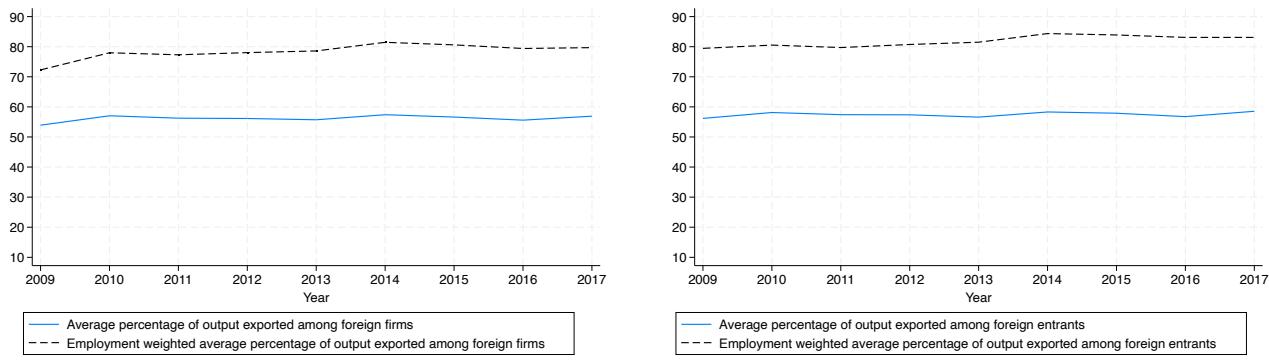


Figure B10: Percentage of output exported by foreign manufacturing firms

*Note:* The data is from the 2009 through 2017 Vietnam Technology and Competitiveness Survey. We matched firms to the Vietnam Enterprise Survey to identify firms that entered after 2000. Source: Vietnam GSO and authors' calculations.

Seventh, linkages between foreign and domestic firms are relatively small as foreign firms import

the majority of their inputs and do not purchase many domestically-sourced inputs from domestic firms. At the same time, private firms do not source many inputs from foreign firms operating in Vietnam. We use the 2011 VTCS data to establish these facts. In Table B3 we report the share of inputs imported and the share of inputs sourced from foreign firms operating in Vietnam for four sets of manufacturing firms in the VTCS: all foreign firms, exporting foreign firms, all private firms, and exporting private firms. We report these results for overall manufacturing as well as within one important industry, clothing, to demonstrate that these patterns hold within industries. Foreign firms (exporters) import on average 65% (67%) of their inputs. In contrast, private firms (exporters) import only 24% (34%) of their inputs. Foreign firms (exporters) purchase an additional 14% (14%) of their inputs from foreign firms operating in Vietnam. In sum, foreign firms (exporters) source 80% (81%) of their inputs from sources other than domestic firms. Private firms (exporters) source a very small percentage of their inputs from foreign firms operating in Vietnam, only 3.7% (3.9%). Thus, the extent of linkages between foreign firms as purchasers of inputs from domestic firms or as suppliers of inputs to domestic firms is quite low. This general pattern holds within clothing as well.

Table B3: Source of inputs

	Foreign		Private	
	All	Exporters	All	Exporters
All manufacturing industries				
Share of inputs imported	0.653	0.673	0.236	0.342
Share of inputs from foreign firms in Vietnam	0.143	0.136	0.037	0.039
Number of observations	1,710	1,357	5,254	1,201
Clothing				
Share of inputs imported	0.781	0.788	0.373	0.454
Share of inputs from foreign firms in Vietnam	0.089	0.085	0.046	0.045
Number of observations	212	199	374	169

*Notes:* Estimates are employment weighted and derived from the 2011 Vietnam Technology and Competitiveness Survey and the 2011 Vietnam Enterprise Survey.

In summary, this analysis highlights that while the U.S. is a key export destination for foreign and private exporters, foreign firms are more likely to export than private firms and foreign firms are exporting more intensively and begin exporting more immediately upon the start of the operations than private firms. This highlights the importance of foreign firms for exporting in Vietnam.

## B.4 Other significant changes in trade policy

In Section 4, we establish that industry-specific BTA tariff reductions are not correlated with pre-existing trends in trade flows and likely do not reflect spurious correlation with other industry demand or supply factors. Given the long period covered in our analysis after the implementation of the BTA, we briefly discuss some of the other changes in trade policy that occurred after the implementation of the BTA. We focus on episodes of export liberalization involving Vietnam’s most important trading partners and Vietnam’s import tariff changes. The analysis and discussion below highlights that the U.S. tariff reductions are substantially larger than tariff changes in other agreements (i.e. averaging a 30 percentage point drop in tariffs in a key export destination in one year relative to at most a 17 percentage point average import tariff decline in these trade agreements). Most importantly, while factors such as “future” trade policy changes can influence outcomes of interest, they would only potentially affect our results if they are spuriously correlated with the U.S. tariff cuts. The analysis below shows that this is not the case. Importantly, our empirical work examines the cumulative annual effects of the U.S. tariff cuts with annual data covering a long period rather than simply relying on data at the start and end of our period, a period during which multiple agreements take place. To the extent that these agreements would be driving our results, we would expect them to influence the estimated coefficients at the time that these agreements come into effect. However, the magnitude of the effects of the BTA on exports to the U.S. is relatively large in the short to medium run aftermath of the BTA implementation, levels off thereafter, and we do not observe discrete increases in the magnitude of the coefficients when the other agreements are implemented.

**Changes in foreign market access:** Figure B11 displays the average manufacturing tariffs faced by Vietnamese exports to the EU, Japan, and China, three of its other major export markets during this period. The tariffs applied by the EU and Japan were low throughout this period. In contrast, China’s tariffs applied against Vietnam fell due to a combination of reductions in its MFN tariffs following its WTO accession in 2001 and reductions negotiated as part of the ASEAN-China trade agreement.<sup>15</sup> As discussed in section B.2, China accounted for less than 5% of Vietnam’s exports up to 2010. Most importantly, Figure B12 demonstrates that Chinese tariff reductions on Vietnam’s exports between 2000 and 2011 are not significantly correlated with the US BTA tariff reductions, with a partial correlation of 0.060 (standard error 0.079).

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<sup>15</sup>The agreement came into force in July 2005.

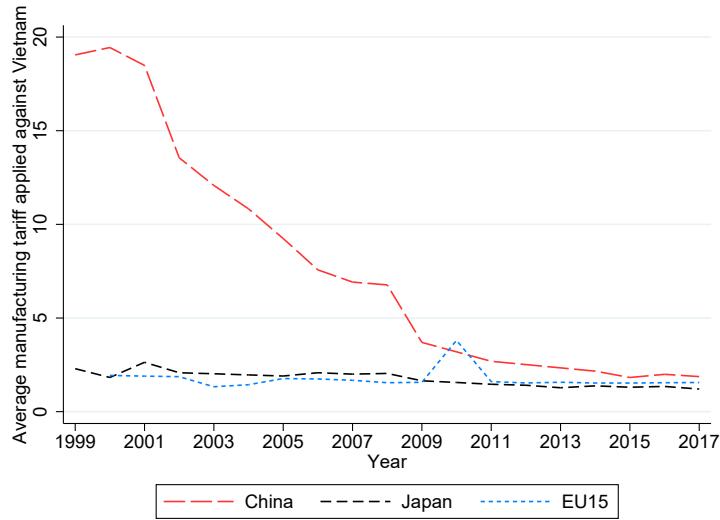


Figure B11: Average manufacturing tariff applied against Vietnam

*Note:* The average is a simple average over industry tariffs reported by 4-digit ISIC revision 3 industries. The industry tariffs were sourced from the World Integrated Trade Solution database and are themselves simple averages of the effectively applied HS product tariffs. Source: World Bank WITS and authors' calculations.

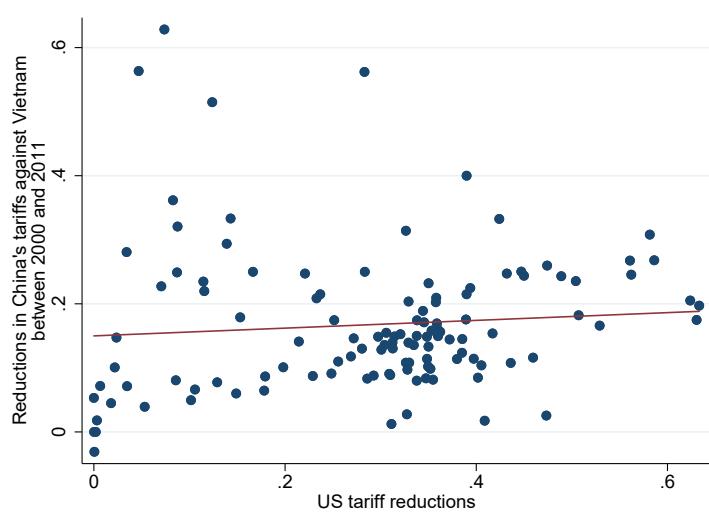


Figure B12: Reductions in Chinese tariffs against Vietnam versus US tariff reductions

*Note:* The data for Chinese tariffs is from World Integrated Trade Solutions. They were converted from 6-digit HS to 4-digit ISIC revision 3 industries using concordances from WITS. Each 4-digit industry tariff is a weighted average of 6-digit HS tariffs where the weights are total Chinese imports by 6-digit HS product. The change in Chinese tariffs applied against Vietnam is calculated as China's MFN tariff in 2000 minus China's tariffs applied against ASEAN members in 2011. The US tariff reduction is calculated as the Column 2 tariff minus the MFN tariff in 2001. Source: World Bank WITS and authors' calculations.

As Figure B11 shows, there was no significant change in the overall trade policy structure that Vietnam faced when exporting to the EU during this period. However, Vietnam's two largest export industries to the EU, footwear and clothing, faced anti-dumping duties and quantitative quotas, respectively. From 2006 through 2011, the EU applied a 10% anti-dumping duty on

footwear with leather uppers. For clothing and textiles, from 1 January 1993 through to 31 December 2004, Vietnamese exports to the EU were subject to quantitative restrictions. These quantitative restrictions were removed as of 1 January 2005 due to the 2004 bilateral agreement between Vietnam and the EU as part of Vietnam's WTO accession negotiations.<sup>16</sup> As discussed and indicated in Panels (a) and (b) of Figure C6 our main findings are quantitatively similar when we exclude the industries most heavily affected by changes in EU trade policy.

**Domestic import tariff liberalization:** Figure B13 shows the average manufacturing import tariff applied by Vietnam to ASEAN members, China, Japan, and the overall MFN tariff rate. To begin with, these are tariffs that influence imports arriving to Vietnam rather than export market access. With the exception of import tariff reductions against ASEAN members, import tariff declines occur after 2006, several years after negotiation and implementation of the BTA. For example, WTO mandated import tariff reductions begin in 2007 and are largely completed by 2013. Liberalization with China begins in 2007 and extends to about 2015. Tariffs on imports from Japan start to fall relative to MFN rates in 2012.<sup>17</sup>

These additional agreements would potentially confound the effect of the BTA only if they were correlated with BTA-induced U.S. tariff cuts. This is not the case. Figure B14 shows Vietnam's various import tariff reductions against the BTA-mandated US tariff reductions. The US tariff reductions are not correlated with the changes in Vietnam's import tariffs during this time. The partial correlations are small in magnitude and statistically insignificant. They are 0.04 for Vietnam's MFN import tariff changes between 2013 and 2006, 0.05 for changes in import tariffs with ASEAN (2006-2001), 0.17 for import tariff changes against China as part of ASEAN (2015-2006), and 0.07 for import tariff changes facing Japan (2017-2012).

In Figure B15, we repeat the analysis of industry employment in foreign firms (Figure 8a), but add controls one at a time for other major changes in trade policy during our period. We use the change in the indicated industry tariffs and interact them with a complete set of year indicators to allow the effects of the other changes in trade policy to change over time. These additional

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<sup>16</sup>The product categories covered by the export restrictions included yarns; woven fabrics; knitted or crocheted fabrics; knitted or crocheted clothing and clothing accessories; clothing and clothing accessories, not knitted or crocheted; and other made-up textile goods.

<sup>17</sup>Vietnam became a member of ASEAN in July 1995. As part of ASEAN's Common Effective Preferential Tariff scheme for the ASEAN Free Trade Area, Vietnam began reducing tariffs applied to ASEAN members. As a member of ASEAN, Vietnam became a member of two subsequent trade agreements between ASEAN and China and ASEAN and Japan. ASEAN also signed important trade agreements with India and South Korea. However, we focus the discussion on Vietnam's most important trading partners.

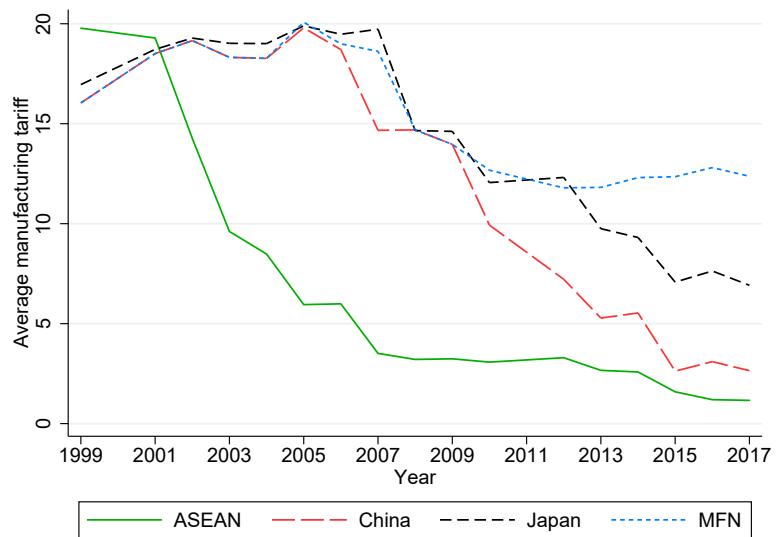
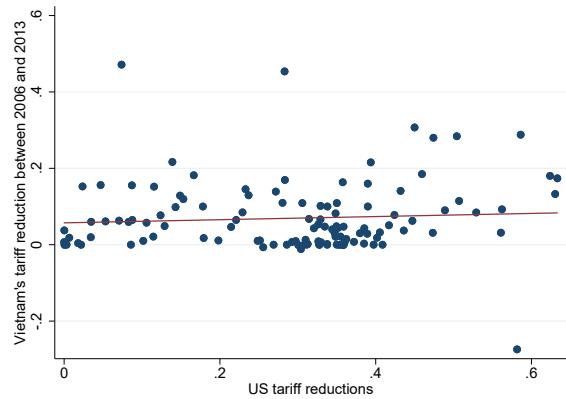


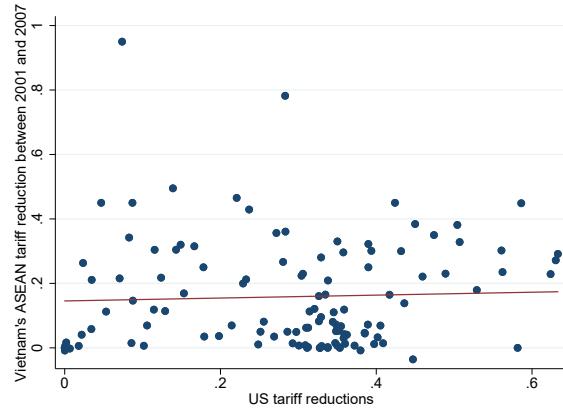
Figure B13: Vietnam's average manufacturing tariff

*Note:* The average is a simple average over industry tariffs reported by 4-digit ISIC revision 3 industries. The industry tariffs were sourced from World Integrated Trade Solution database and are themselves simple averages of the effectively applied HS product tariffs. Source: World Bank WITS and authors' calculations.

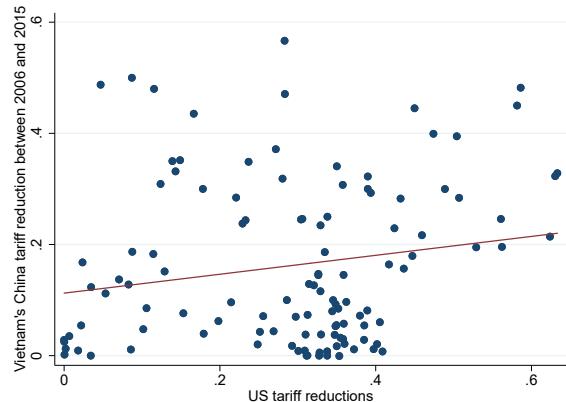
controls barely change the results, consistent with the low partial correlations between the U.S. tariff reductions and each of these changes in trade policy.



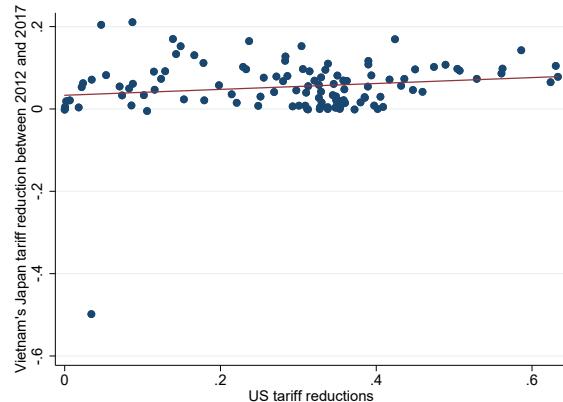
(a) MFN



(b) ASEAN



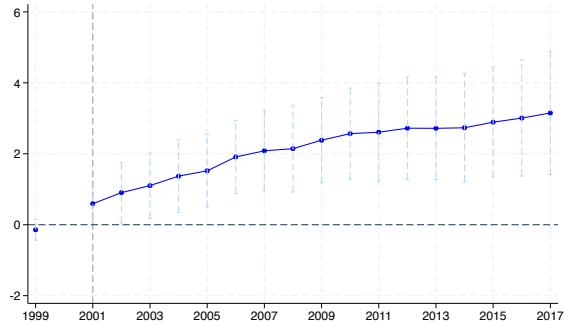
(c) China



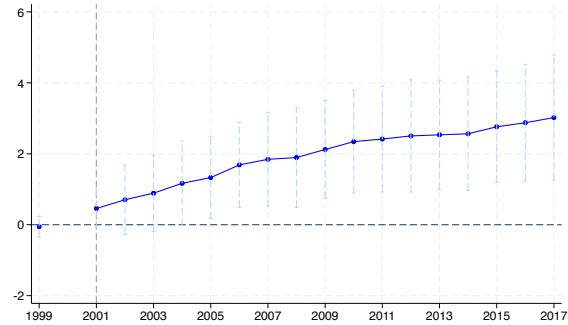
(d) Japan

Figure B14: Vietnam's tariff reductions for various trade partners versus BTA-mandated US tariff reductions

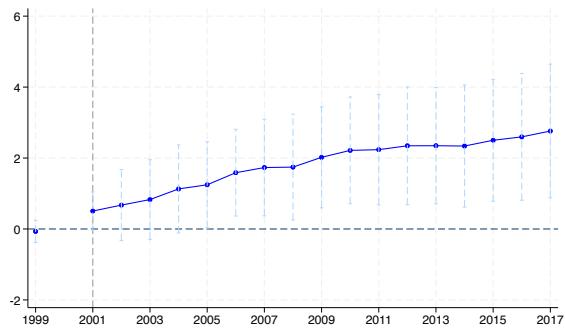
*Note:* The data for Vietnam's tariffs is from World Integrated Trade Solutions. They are effectively applied rates by trading partner by 4-digit ISIC revision 3 industry. The change in Vietnam's tariffs applied against each trading partner is calculated as the tariff in the earlier year minus the tariff in the later year. The US tariff reduction is calculated as the Column 2 tariff minus the MFN tariff in 2001. Source: World Bank WITS and authors' calculations.



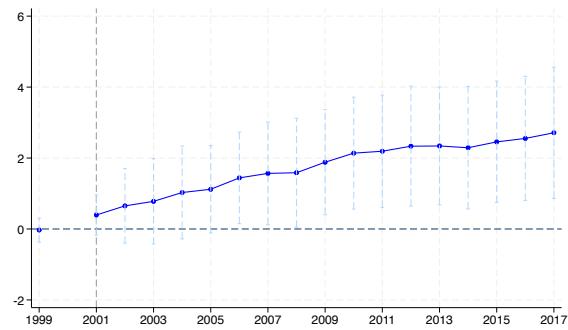
(a) China's tariffs on imports from Vietnam



(b) Vietnam's tariffs on imports from ASEAN



(c) Vietnam's tariffs on imports from China



(d) Vietnam's tariffs on imports from Japan

Figure B15: Foreign employment and BTA tariff reductions controlling for additional changes in trade policy

*Note:* These figures use the same specification as Figure 8a. Specifically, each point reflects an individual regression coefficient from estimating equation (1) where the dependent variable is the log annual employment in foreign firms within an industry. The BTA was implemented in 2001 (indicated by the gray line) and the base year is 2000. The analysis is conducted at the 4-digit industry level. In all figures, controls include 4-digit industry FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. In each panel we add one additional control variable. In panel (a) we include the change in  $\ln$  Chinese tariffs on imports from Vietnam, where the change is calculated between 2000 and 2011, interacted with a complete set of year indicators except for the base year, 2000. In panel (b), we similarly control for the log change in Vietnam's tariffs on imports from ASEAN between 2001 and 2007. In panel (c), we similarly control for the log change in Vietnam's tariffs on imports from China between 2006 and 2015. In panel (d), we similarly control for the log change in Vietnam's tariffs on imports from Japan between 2012 and 2017. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

## B.5 State firms prior to the BTA

This section briefly summarizes reforms of state firms prior to the BTA. It highlights that these reforms were not systematically industry-specific and thus unlikely spuriously correlated with the U.S. tariff cuts, which occurred by a move of Vietnam between two pre-existing U.S. tariff schedules.

Reforms for state firms were initiated by *Doi Moi* in 1986 and their pace has been gradual. Reforms throughout the late 1980s and 1990s were centred around improving the incentives faced by state firms. These included the introduction of a profit-based accounting system, shifting from quantity to profit targets, providing managers with greater autonomy over inputs and prices, the elimination of direct subsidies, allowing state firms to form joint ventures, and removing restrictions on importing and exporting rights (Van Arkadie and Mallon, 2004). In addition, in the early 1990s, many locally owned (i.e., by provinces), small state firms were rapidly liquidated or merged, followed by little such activity for the rest of the 1990s.<sup>18</sup> Despite the reforms, liquidations, and mergers in the 1990s, remaining state firms were less efficient than non-state enterprises and a process of equitization, divestment, and mergers and acquisitions picked up pace in the early 2000s (Mishra, 2011).

Table B4 reports the number of manufacturing state firms operating in Vietnam in several years prior to the BTA.<sup>19</sup> The number fell slowly, with the decline largely due to a reduction in the number of local state firms while the number of central state firms remained essentially unchanged.

Our empirical analysis takes place in a setting that starts off with a larger state share of manufacturing employment than in related work on international trade and politically connected firms (see Khandelwal, Schott and Wei (2013), Brandt et al. (2017), Baccini, Impullitti and Malesky (2019)). The state firms account for 45% of formal manufacturing employment at the start of our sample, as compared to 12.5 to 24% in related work. At that time, state firms operated across almost all 4-digit industries. Importantly, as discussed in section 2.1, we find no statistically significant relationship between the pre-BTA industry employment share of state firms and U.S. tariff cuts. The lack of correlation is not surprising given that, while military leaders, a strong force in

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<sup>18</sup>Vietnam has two broad categories of state firms, those owned by the national or central government and those owned by local (typically provincial) governments.

<sup>19</sup>The data reported in Table B4 comes from a series of annual statistical yearbooks published by the General Statistical Office of Vietnam.

Vietnamese politics, were opposed to the BTA, fearing the consequences for the military's commercial interests in telecommunications and other sectors largely outside manufacturing (Manyin, 2001), they could not have influenced industry-specific tariff cuts within manufacturing. The tariff cuts reflect tariff changes due to the U.S. moving Vietnam from one pre-existing tariff schedule to another.

Table B4: Number of manufacturing enterprises, 1997 to 2001

Ownership	1997	1998	1999	2000	2001
Foreign	654	865	940	1048	1425
SOEs	1645	1619	1581	1429	1340
Central SOEs	506	520	523	483	505
Local SOEs	1139	1099	1058	916	835

*Source:* Various annual statistical yearbooks produced by the General Statistical Office of Vietnam.

## B.6 Financial incentives for foreign firms

It is common for foreign manufacturing firms in Vietnam to receive financial incentives. Although data on financial incentives is not available in the enterprise data, our main firm-level dataset, we use firm-level data from the Provincial Competitiveness Index (PCI) project (Malesky, Phan, and Pham, multiple years) to both provide background on the prevalence of financial incentives and to examine how their distribution has changed over time. We pool data on foreign manufacturing firms surveyed in 2010 through 2019. We use reported information on whether the firm reported receiving any investment incentives and the year the firm received its investment license. We organize the firms by investment license year into four bins: a pre-BTA period, 2000 or earlier, and three post-BTA bins (2001-05, 2006-10, and 2011-16). In Figure B16, we provide scatterplots of the relationship between the share of firms within an industry that received a financial incentive versus the U.S. tariff reduction in the industry. The analysis is conducted at the 2-digit industry level, as is available in the PCI data.

In each period the percentage of foreign manufacturing firms that received financial incentives was high. Around 80% of foreign firms received a financial incentive in 2000 and earlier, and 2001 to 2005. Over time the average percentage fell to about 75% in 2006 to 2010 and further to about 60% in 2011 to 2016. Given the high share of firms receiving financial incentives, one might

be worried that financial incentives were more likely for firms in high tariff-reduction industries thereby partially contributing to the estimated effects. However, importantly, there is little evidence that firms in industries that received larger U.S. tariff reductions were more likely to receive financial incentives. In the periods 2000 and earlier, and 2006 to 2010 the partial correlation is negative (-0.130 with a standard error of 0.165 for 2000 and earlier, and -0.350 with a standard error of 0.129 for 2006 to 2010), while in 2001 to 2005 the partial correlation is almost 0 (0.002 with a standard error of 0.132). The period 2010 to 2016 is the only period in which the partial correlation is positive, but it is not statistically different from 0 (0.170 with a standard error of 0.244). Hence, it does not appear as though the prevalence of financial incentives for foreign manufacturing firms systematically influenced the response of foreign entrants to the U.S. tariff reductions.

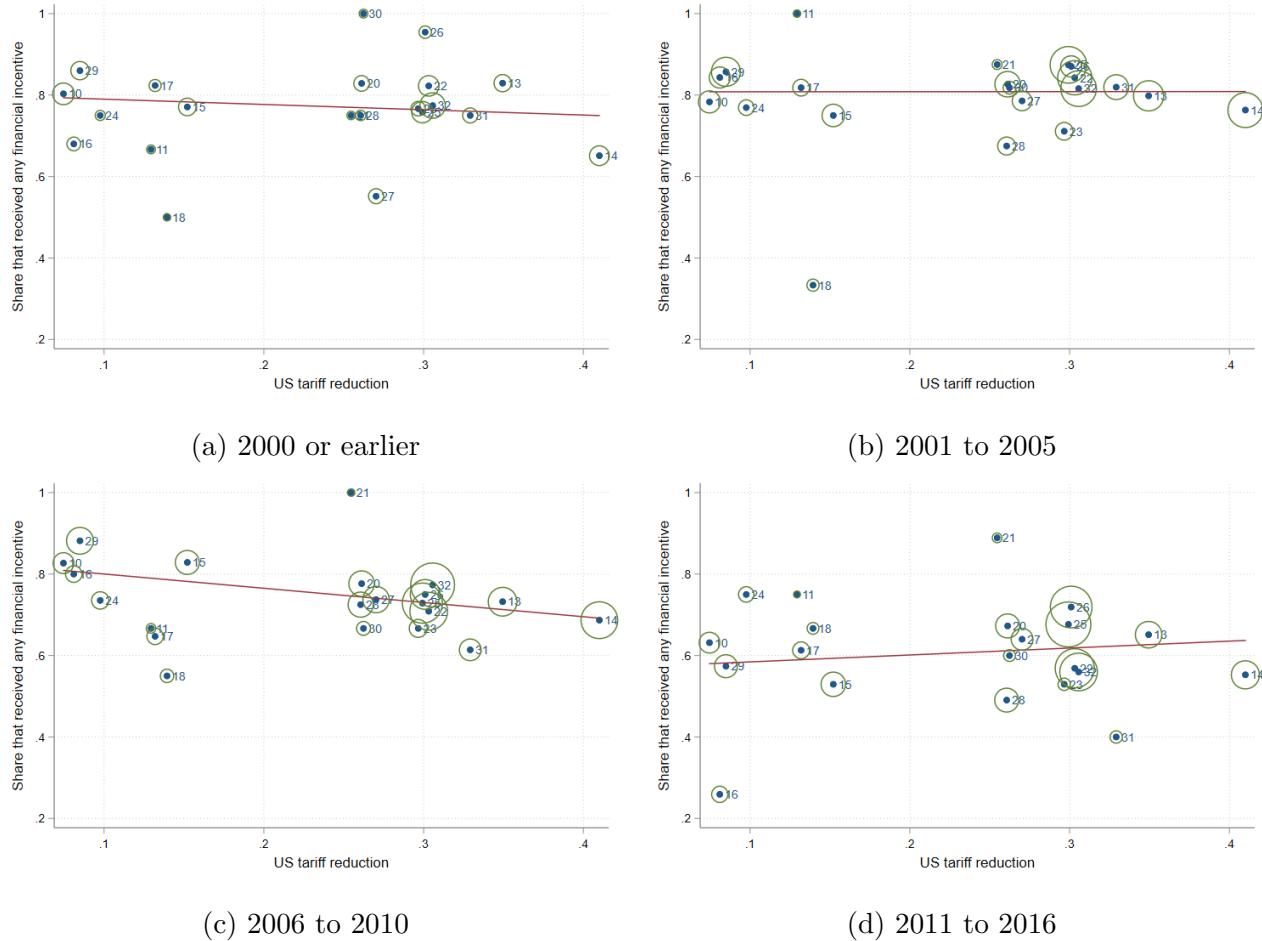


Figure B16: Share of foreign firms within an industry receiving financial incentives by investment license year

*Note:* Each panel shows the share of firms within an industry that reported receiving a financial incentive to invest by investment license period. Observations are weighted by the number of firms in each industry.

We can use the same data to explore the likelihood of a foreign firm receiving a financial investment incentive based on the firm's source country. We focus on foreign firms that received their investment license in 2000 through 2017. As shown in Table B5, the vast majority of foreign firms received financial incentives, such as a tax reduction or a tax holidays, but firms from Japan and Taiwan were slightly more likely to receive incentives than firms from other countries and South Korean firms were slightly less likely. Thus, financial incentives were not systematically favoring firms from these countries relative to other source countries.

Table B5: Prevalence of investment incentives for foreign manufacturing firms by source country

Source country	Number of observations	Percentage that received financial incentives
Japan	1,039	75.1
South Korea	540	68.3
Taiwan	611	76.8
Others	1,810	73.3

*Notes:* The sample is foreign manufacturing firms in the 2010 through 2017 Provincial Competitiveness Index surveys who reported receiving their investment license in 2000 through 2017.

## B.7 Long run employment changes by industry

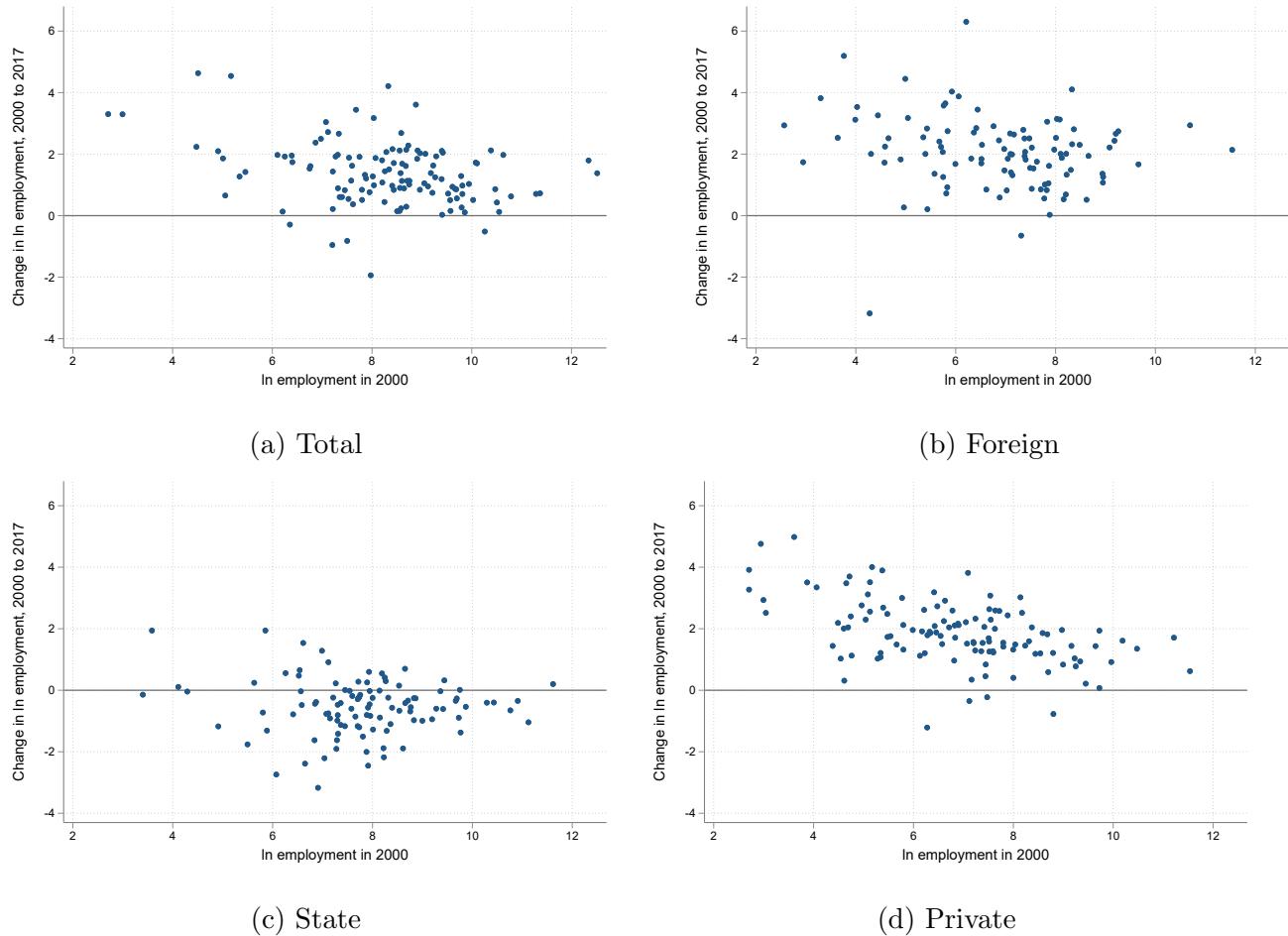


Figure B17: Change in employment relative to initial employment

*Note:* Each panel shows total employment by ownership where ownership is defined by the firm's initially reported ownership.

## B.8 Worker characteristics

In this subsection we provide information on characteristics of workers in formal manufacturing. This is to help us understand which workers are driving the large expansion in employment in formal manufacturing. We use information from the 1999 and 2009 population censuses, as well as the 2008 Vietnam Household Living Standards Survey. In Table B6, we report the estimated number of workers, the share of female workers, the mean age and grade, and the share of workers that are internal migrants (migrated across provinces within the 5 years prior to the census) by ownership.<sup>20</sup> Workers in foreign firms, compared to state or private, are more likely to be women, are younger, better educated on average than private, but less so than state, and more likely to be internal migrants, particularly in 2009. The growth in the number of women in foreign manufacturing (just under 1 million in 2009) is consistent with estimates from the firm-level data, which suggests the number of women in foreign manufacturing firms grew from 0.2 to 2.8 million between 1999 and 2017.

Table B6: Worker characteristics

Ownership	Number of workers	Share female	Mean age	Mean grade	Share migrants
1999					
State	733,287	0.518	32.5	9.9	0.082
Private	200,466	0.470	28.5	8.0	0.144
Foreign	146,148	0.688	25.7	9.1	0.180
Mixed	195,228	0.643	26.5	8.8	0.229
2009					
State	559,709	0.440	33.5	10.6	0.103
Private	1,640,867	0.501	29.4	9.1	0.201
Foreign	1,464,647	0.658	26.5	9.8	0.370

*Note:* Source: Authors' calculations using data from the 1999 (33% sample) and 2009 (15% sample) population censuses and the 2008 Vietnam Household Living Standards Survey. The estimates for mean grade in 2009 are from the 2008 Vietnam Household Living Standards Survey as there is not a consistently defined grade question in the 2009 population census. All other estimates are from the respective census.

<sup>20</sup>Note that the 1999 census uses ownership categories that do not perfectly match the categories in the firm data. By 2009, the census dropped that category. In particular, the category “mixed” includes joint ventures between foreign and domestic firms as well as domestic firms with mixed private-state ownership. The firm-level data provides more disaggregated ownership categories. This allows us to classify a firm with mixed ownership as (1) state if it is a joint state-private firm where the state ownership is 50% or greater, (2) private if it is a joint state-private firm where the state ownership less than 50%, and (3) foreign if it is a joint venture between a foreign and domestic firm.

## C Falsification Tests and Robustness Checks

### C.1 Pre-BTA industry trends and U.S. tariff cuts

In this section we examine whether U.S. tariff cuts are spuriously correlated with industry trends prior to the implementation of the BTA. The annual enterprise surveys, which we use in our main analysis, become available in 2000. Consequently, our pre-trend analysis relies on industry-level data at the 2-digit level collected from a series of annual statistical yearbooks published by the General Statistics Office of Vietnam (2006) and summary tables from the 1998 Industrial Census provided by the GSO.<sup>21</sup> Our analysis consistently shows that trends leading up to the implementation of the BTA were not correlated with the subsequent U.S. tariff reductions.

We start by showing that the U.S. tariff reductions are not correlated with initial conditions (ln industry employment, ownership based employment shares, capital per worker, wages per worker, and revenue per worker) within formal manufacturing at the 4-digit industry level (Table C1).

#### C.1.1 Industry employment changes prior to the BTA and US tariff reductions

Next, we examine whether changes in industry employment prior to the BTA are related to the subsequent US tariff reductions. Information on employment by 2-digit industry is available starting in 1995 from a series of annual statistical yearbooks published by the GSO. We regress the change in ln employment within an industry (calculated as ln employment in 2000 - ln employment in year t) on the U.S. tariff reduction (calculated the same way as in the main text) and report the estimated coefficients in Table C2. All five regressions demonstrate that the U.S. tariff reductions explain little of the variation in change in industry employment prior to the BTA, as the R-squared values are all small, and the partial correlation is very close to 0 and not statistically significant.

For comparison purposes, we perform the same analysis at the two-digit industry level between 2000 and year t for years 2001 through 2004. Table C3 shows that after the BTA, larger US tariff cuts are positively associated with changes in industry employment and the coefficients become increasingly larger as time passes. These results at the 2-digit level are consistent with the evidence on the relationship between tariffs and industry employment at the 4-digit level in the main text in Figure 7.

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<sup>21</sup>The micro data from the 1998 Industrial Census is not available.

Table C1: Partial correlation between US tariff reductions and initial industry conditions

	(1)
ln industry employment	0.003 (0.025)
State employment share	-0.096 (0.093)
Private employment share	0.091 (0.092)
Foreign employment share	0.106 (0.153)
Capital per worker	-0.336 (0.239)
Wage per worker	-0.016 (5.279)
Revenue per worker	-0.132 (0.106)
Observations	116

*Note:* \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Each coefficient is from a separate regression where the dependent variable is the reduction in  $\ln(1+\text{US tariff})$  and the explanatory variable is indicated by the row label and is calculated using 2000 data. All regressions are done at the 4-digit industry level and weighted by industry employment in 2000, as is done in our main analysis. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

Table C2: Partial correlation between US tariff reductions and prior industry employment changes

	(1) 1995 to 2000	(2) 1996 to 2000	(3) 1997 to 2000	(4) 1998 to 2000	(5) 1999 to 2000
US tariff reduction	-0.567 (0.751)	-0.317 (0.555)	-0.166 (0.304)	0.079 (0.227)	-0.004 (0.107)
R-squared	0.030	0.016	0.014	0.006	0.000
Observations	22	22	22	22	22

*Note:* \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Each coefficient is from a separate regression where the dependent variable is the change in  $\ln$  industry employment calculated as  $\ln$  employment in the indicated year minus  $\ln$  employment in 2000 and the explanatory variable is the reduction in  $\ln(1+\text{US tariff})$ . All regressions are done at the 2-digit industry level and weighted by industry employment in 2000, as is done in our main analysis. Source: Vietnam GSO, USITC, and authors' calculations.

Table C3: Partial correlation between US tariff reductions and industry employment changes after the BTA

	(1) 2000 to 2001	(2) 2000 to 2002	(3) 2000 to 2003	(4) 2000 to 2004
US tariff reduction	0.184* (0.089)	0.424* (0.216)	0.606* (0.335)	0.842* (0.433)
R-squared	0.202	0.231	0.230	0.241
Observations	22	22	22	22

*Note:* \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Each coefficient is from a separate regression where the dependent variable is the change in ln industry employment calculated as ln employment in 2000 minus ln employment in the indicated year and the explanatory variable is the reduction in ln(1+US tariff). All regressions are done at the 2-digit industry level and weighted by industry employment in 2000, as is done in our main analysis. Source: Vietnam GSO, USITC, and authors' calculations.

### C.1.2 Industry employment changes by ownership prior to the BTA

We next examine whether changes in industry employment by ownership prior to the BTA are related to the subsequent US tariff reductions. Industry level employment data disaggregated by firm ownership is only available in 1998. This data is based on tables published from the 1998 Industrial Census and provided to us by the GSO. The ownership data is reported by three broad categories: state, private, and foreign.<sup>22</sup> We combine this data from 1998 with industry employment estimates from the firm data in 2000.

We begin the analysis by looking at changes in ln employment between 1998 and 2000 for each ownership. We regress the change in ln employment, calculated as ln employment in 2000 minus ln employment in 1998, on US tariff reductions. Table C4 shows the results for state, private, and foreign. We see little evidence that the changes in ln employment between 1998 and 2000 are related to subsequent BTA tariff reductions for state and private. For employment in foreign, we find a statistically significant but negative relationship—the opposite direction of our results reported post-BTA in section 4. This suggests that our post-BTA results for growth in employment in foreign may be an underestimate given the negative relationship between 1998 and 2000.

Table C4: Partial correlation between US tariff reductions and prior industry employment changes by ownership

	(1) State	(2) Private	(3) Foreign
US tariff reduction	-0.181 (0.360)	-0.362 (0.623)	-0.842** (0.348)
R-squared	0.011	0.026	0.165
Observations	20	21	22

*Note:* \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Each coefficient is from a separate regression where the dependent variable is the change in ln industry employment calculated as ln employment in 2000 minus ln employment in 1998 for the indicated ownership and the explanatory variable is the reduction in ln(1+US tariff). All regressions are done at the 2-digit industry level and weighted by industry employment in 2000, as is done in our main analysis. Source: Vietnam GSO, USITC, and authors' calculations.

We also examine the changes in employment shares within industry by ownership, as in section

<sup>22</sup>These definitions match up very well with the ownership definitions from the annual enterprise survey we use in our main analysis. The only difference is that all joint stock companies, regardless of the state's ownership share, were defined as private for the purposes of these tables. Employment in joint stock companies represented only 2% of total employment in formal manufacturing in 1998. Hence, our inability to disaggregate joint stock companies by the state's ownership share is not likely to be very important. To be consistent in the definition of ownership across the two data sources, we employ the same broad ownership categories as in the 1998 Industrial Census.

5. We regress the change in the within-industry employment share between 1998 and 2000 on the subsequent US tariff reduction. The within-industry employment share is calculated as employment in ownership  $o$  divided by total employment in the industry. The change is calculated as the 2000 share minus the 1998 share. The regression results, shown in Table C5, consistently show no relationship between the US tariff reductions and changes in the within-industry ownership employment shares in the two years prior to the BTA.

Table C5: US tariff reductions and within-industry employment shares prior to the BTA

	(1) State	(2) Private	(3) Foreign
US tariff reduction	0.042 (0.121)	0.016 (0.146)	-0.058 (0.064)
R-squared	0.010	0.002	0.020
Observations	22	22	22

*Note:* \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Each coefficient is from a separate regression where the dependent variable is the change in the within-industry ownership employment share calculated as the share of industry employment in the indicated ownership in 2000 minus the share of industry employment in the indicated ownership in 1998 and the explanatory variable is the reduction in  $\ln(1+\text{US tariff})$ . All regressions are done at the 2-digit industry level and weighted by industry employment in 2000, as is done in our main analysis. Source: Vietnam GSO, USITC, and authors' calculations.

### C.1.3 Controlling for pre-existing trends and employment results

In this section, we follow two approaches to directly control for pre-existing trends in the  $\ln$  industry employment regressions. First, we use the change in  $\ln$  industry employment between 1999 and 2000 at the 4-digit industry level. Second, we use the change in  $\ln$  industry employment between 1998 and 2000 at the 2-digit industry level. We then interact these trends with a complete set of year indicators excluding 2000, our base year. For both approaches we calculate the relevant trend separately for overall industry employment and industry employment in foreign, state, and private respectively.

Figure C1 shows the results from the first approach, where we use the change in  $\ln$  employment between 1999 and 2000 interacted with a set of year indicators as additional controls. Note that we can no longer use  $\ln$  employment in 1999 as an outcome as its change relative to 2000 would be perfectly colinear with the added controls. As such, the plotted regression coefficients begin in 2001, with 2000 as the omitted base year. The long run employment results for total industry employment are slightly lower when we control for the change in  $\ln$  employment between 1999 and

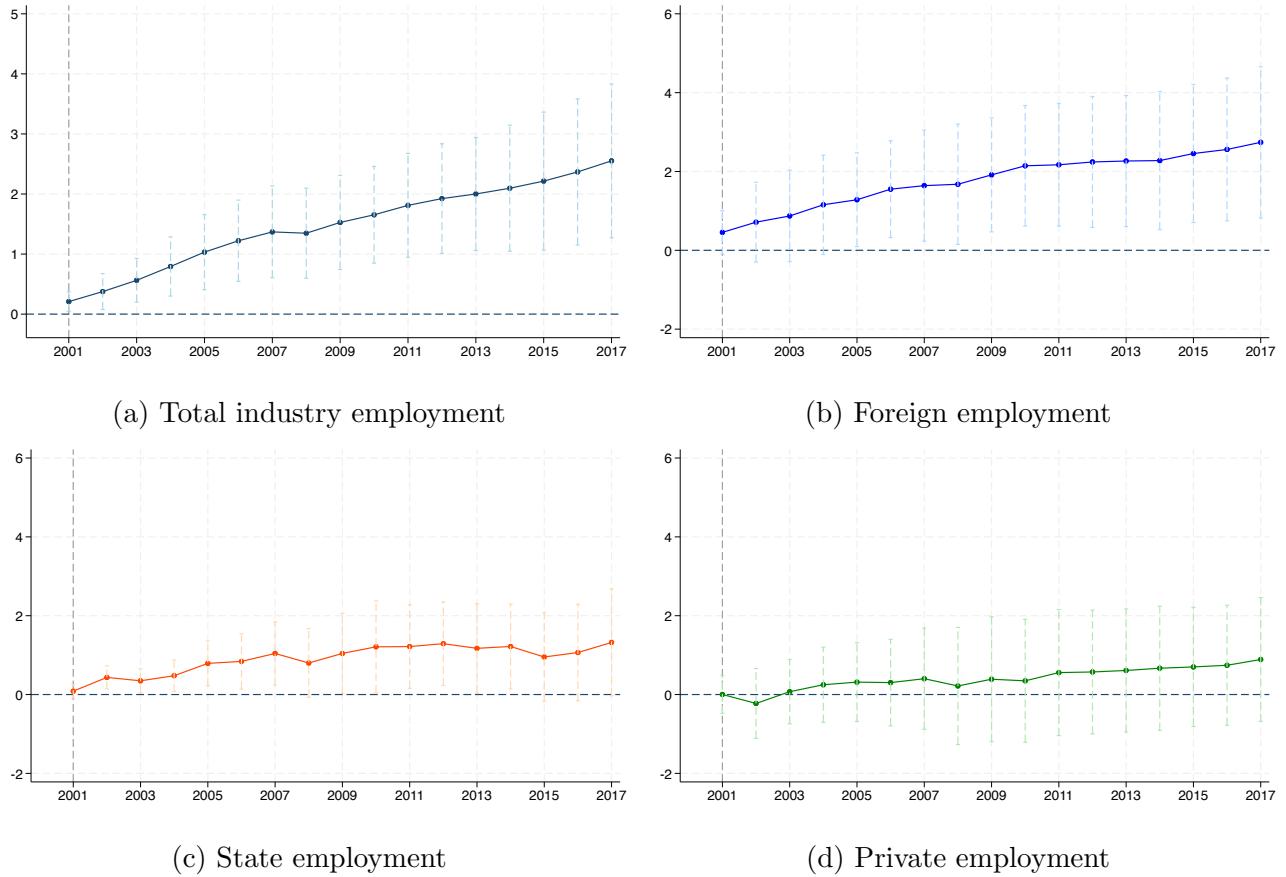


Figure C1: Employment and BTA tariffs, controlling for 1999-2000 trend

*Note:* Each point reflects an individual regression coefficient from estimating equation (1) separately for total industry employment and industry employment in each ownership type. The change in ln employment between 1999 and 2000, interacted with a complete set of year indicators, has been added as additional controls. The dependent variable is the log annual employment in an industry for total employment in Panel (a), foreign in Panel (b), state in Panel (c), and private in Panel (d). The BTA was implemented in 2001 (indicated by the gray line) and the base year is 2000. The analysis is conducted at the 4-digit industry level. In separate regressions for each panel, controls include 4-digit industry FE, year FE, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment.

Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

2000, as the coefficient is 2.55 in 2017 as compared to 2.92 in Figure 7a, but the overall pattern of results is remarkably similar.

Figure C2 shows the results from the second approach, where we use the change in ln employment between 1998 and 2000 at the 2-digit industry level interacted with a set of year indicators as additional controls. The long run employment results for total industry employment are slightly lower when we control for the change in ln employment between 1999 and 2000, as the coefficient is 2.76 in 2017 as compared to 2.92 in Figure 7a, but again the overall pattern of results is remarkably similar. This is true for the regression results by ownership as well.

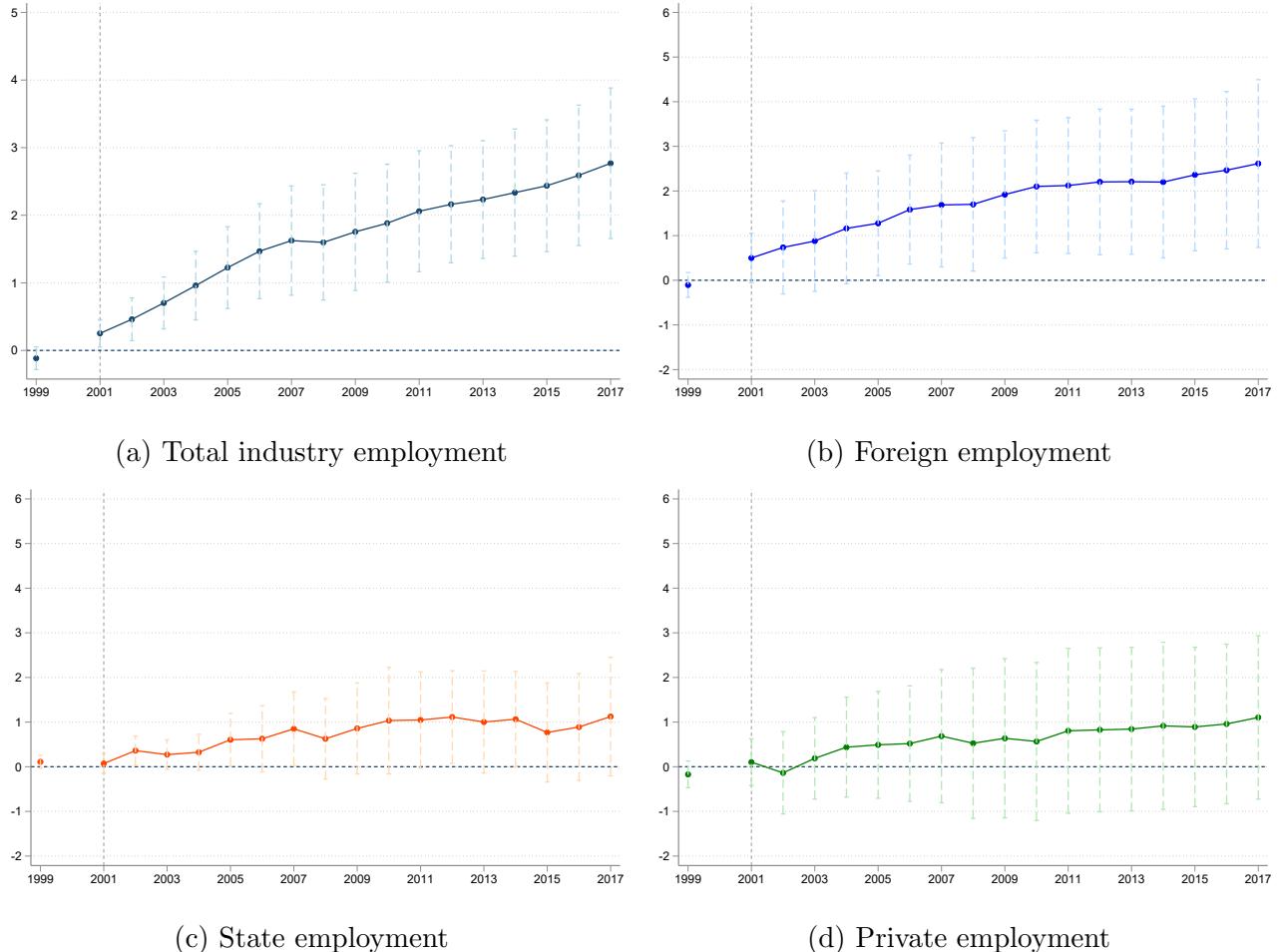


Figure C2: Employment and BTA tariffs, controlling for 1998-2000 trend

*Note:* Each point reflects an individual regression coefficient from estimating equation (1) separately for total industry employment and industry employment in each ownership type. The change in ln employment between 1998 and 2000 at the 2-digit industry level, interacted with a complete set of year indicators, has been added as additional controls. The dependent variable is the log annual employment in an industry for total employment in Panel (a), foreign in Panel (b), state in Panel (c), and private in Panel (d). The BTA was implemented in 2001 (indicated by the gray line) and the base year is 2000. The analysis is conducted at the 4-digit industry level. In separate regressions for each panel, controls include 4-digit industry FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

## C.2 Robustness of trade results

We find that U.S. tariff reductions due to the BTA induced a large immediate increase in Vietnamese exports to the U.S. in Figure 5. In this subsection we test the robustness of our trade results. Even though our main analysis is done at the 3-digit industry level, our results are robust to industry aggregation to 2-digit industries and disaggregation to 4-digit industries (Figure C3). Additionally, our estimates are not sensitive to each inclusion of our industry-level controls for other trade policy changes that took place during our period of analysis (Figure C4) and to the exclusion of all these industry-level controls (Figure C5a). Our results are also robust to the omission of any one industry from our estimation (Figure C6). From Figure 6, we find that these tariff cuts do not impact Vietnamese exports to the E.U. and major trading partners in East Asia (South Korea, Japan, Hong Kong, and China). These findings are also robust to the exclusion of all these industry-level controls (Figures C5b and C5c for the E.U. and East Asia respectively).

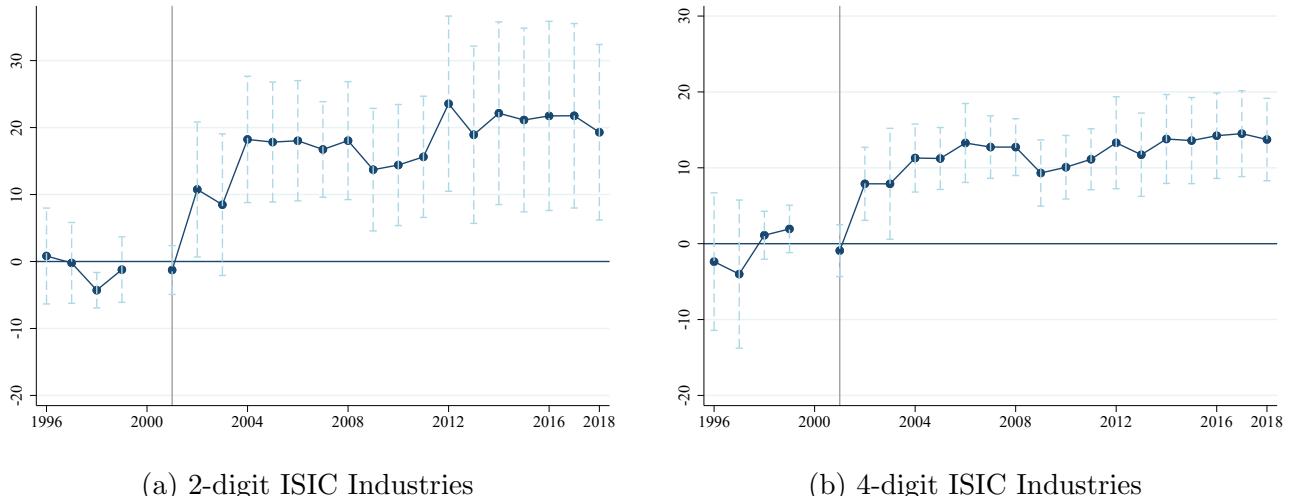


Figure C3: Vietnam exports to the US and BTA tariffs at 2- and 4-digit ISIC Industries, 1996-2018

*Note:* Each point reflects an individual regression coefficient,  $\hat{\beta}_{t'}$ , following equation (1). The BTA was implemented in 2001 (indicated by the gray line) and the base year is 2000. Panel (A) is estimated at the 2-digit ISIC industry-level while Panel (B) is estimated at the 4-digit level. Correspondingly, this applies to the industry-level controls and clustering of standard errors as well. Controls include industry FE, year FE, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the US in year  $t$ , and US import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the industry level. Weighted by year 2000 Vietnam exports to the world. Source: UN Comtrade, USITC, World Bank WITS, and authors' calculations.

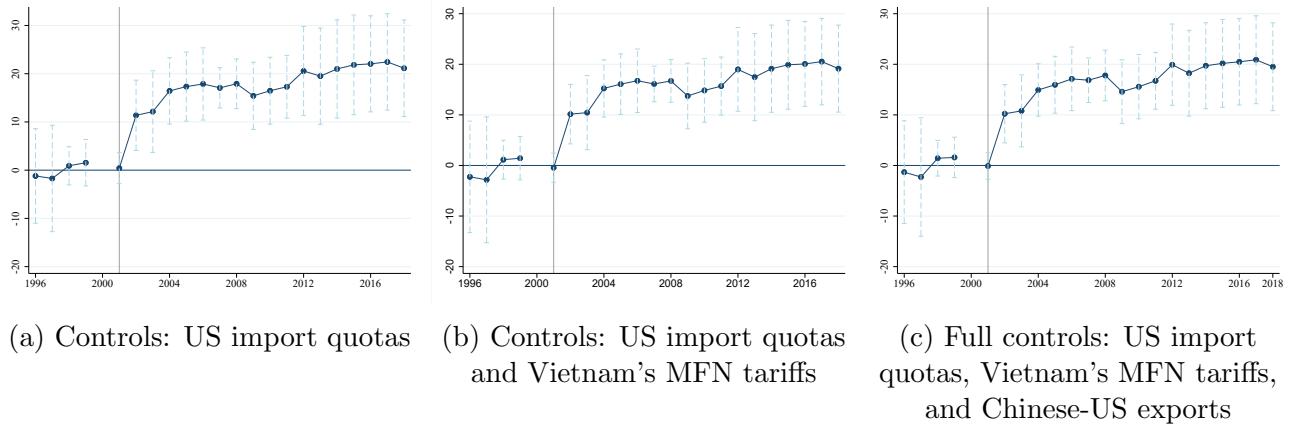
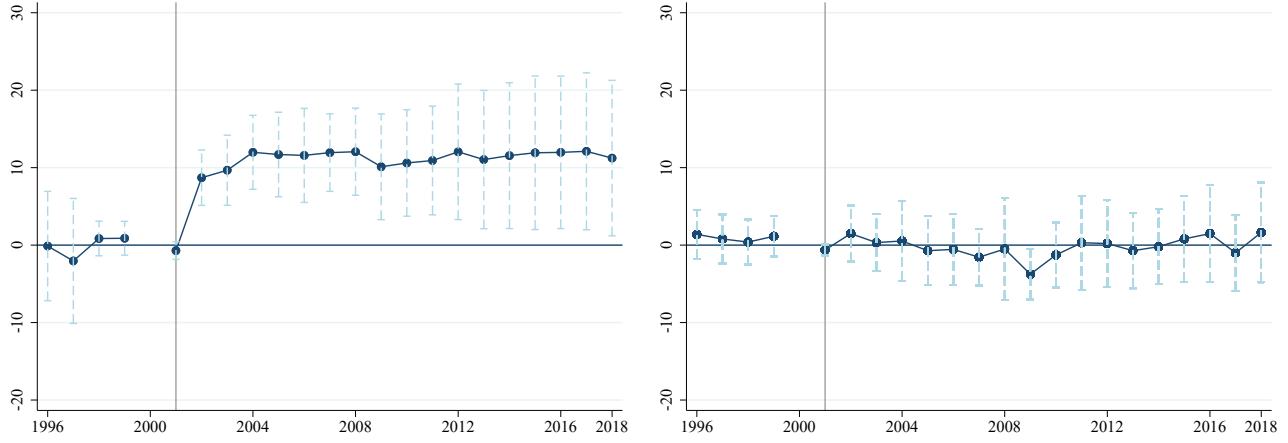
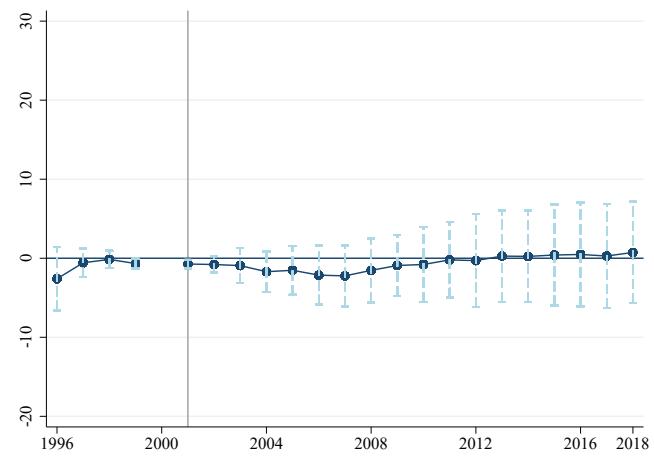


Figure C4: Vietnam exports to the US and BTA tariffs, 1996-2018: Robustness to Controls

*Note:* The BTA was implemented in 2001 (indicated by the gray line) and the base year is 2000. All Panels are estimated at the 3-digit ISIC industry-level with industry-level FE and year FE. Panel (a) controls for US import quotas on textiles and clothing applied to Vietnam and China respectively. Panel (b) controls for US import quotas on textiles and clothing applied to Vietnam and China respectively as well as the change in Vietnam's MFN tariffs due to WTO accession. Panel (c) reproduces Figure 5 for Vietnam exports to the US which controls US import quotas on textiles and clothing applied to Vietnam and China respectively, the change in Vietnam's MFN tariffs due to WTO accession, and Chinese exports to the US in each year. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the industry level. Weighted by year 2000 Vietnam exports to the world. Source: UN Comtrade, USITC, World Bank WITS, and authors' calculations.



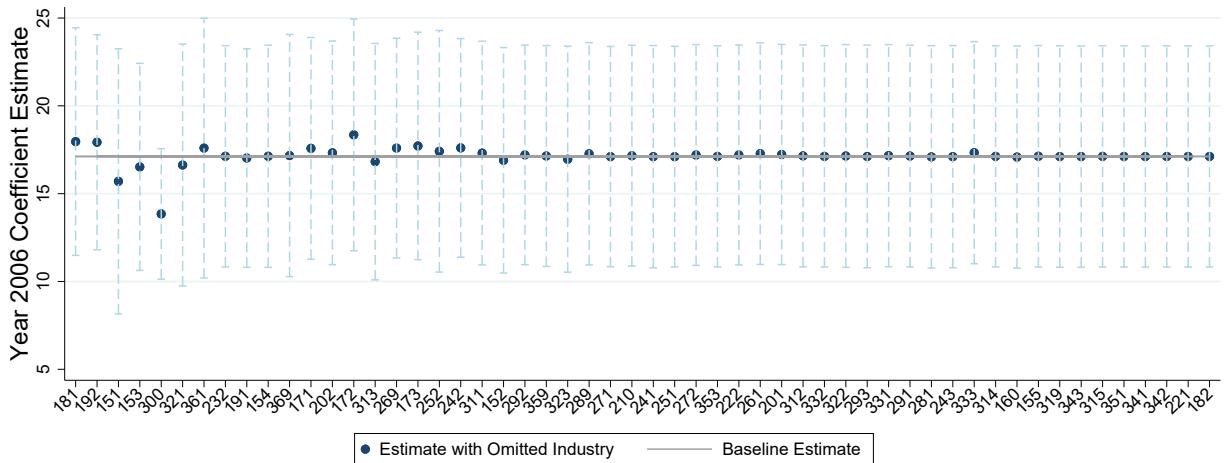
(a) Vietnam Exports to the US, without controls (b) Vietnam Exports to the E.U., without controls



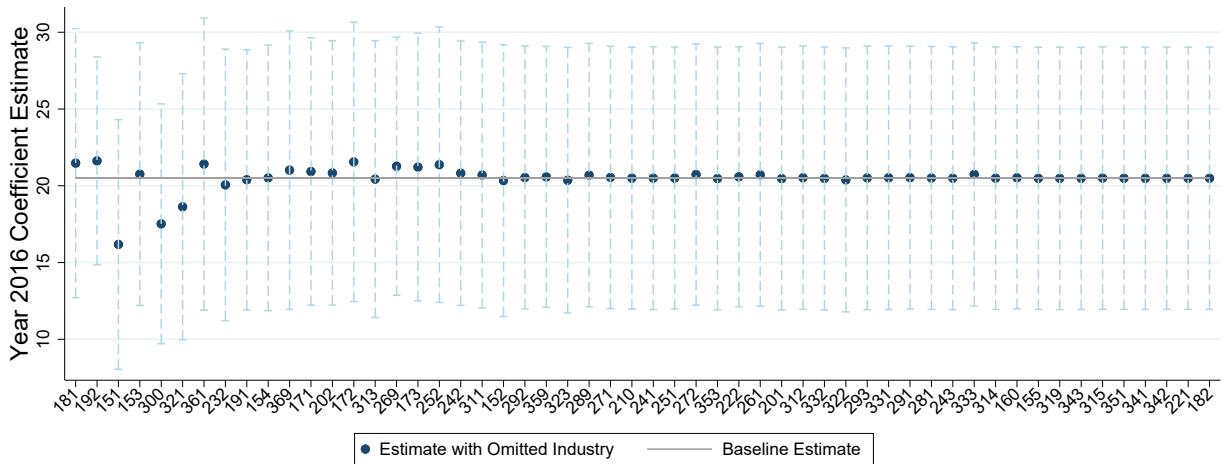
(c) Vietnam Exports to East Asia, without controls

Figure C5: Vietnam exports to key trading partners and BTA tariffs without controls, 1996-2018

*Note:* Each point reflects an individual regression coefficient,  $\hat{\beta}_{t'}$ , following equation (1). Figure C5a reproduces Figure 5 for Vietnam exports to the US but without controls (detailed below). The dependent variable in Figure C5b is Vietnamese exports to the European Union (EU15 excluding Belgium and Luxembourg due to lack of data consistency). Figure C5c is the same estimation as in Figure 6b but without controls. The dependent variable in Figure C5c is Vietnamese exports to 4 East Asian countries (South Korea, Japan, China, and Hong Kong). Taiwan is excluded due to lack of data consistency. Figure C5b is the same estimation as in Figure 6a but without controls. The BTA was implemented in 2001 (indicated by the gray line) and the base year is 2000. The analysis is conducted at the 3-digit industry level. Controls include 3-digit industry FEs, year FE, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the US in year  $t$ , and US import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 3-digit industry level. Weighted by year 2000 Vietnam exports to the world. Source: UN Comtrade, USITC, World Bank WITS, and authors' calculations.



(a) Year 2006 Coefficient Estimate



(b) Year 2016 Coefficient Estimate

Figure C6: Estimate of Vietnam exports to the US and BTA tariffs with each industry omitted

*Note:* Each point reflects an individual regression coefficient,  $\hat{\beta}_{t'}$ , following equation (1), for year 2006 (Panel (a)) and year 2016 (Panel (b)), where each 3-digit industry on the x-axis is removed respectively. The 3-digit industries are sorted by total Vietnamese exports to the world in year 2000 (largest on the left and smallest on the right). The analysis is conducted at the 3-digit industry level.

Controls include industry-level FEs, year FE, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the US in year  $t$ , and US import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the industry level. Weighted by year 2000 Vietnam exports to the world. Source: UN Comtrade, USITC, World Bank WITS, and authors' calculations.

### C.3 Robustness to contemporary ownership

The analysis in the main text relies on initial ownership. We find that our results are robust to using either initial or contemporary ownership definition. First, we reproduce Figure 2 using initial rather than contemporary ownership (Figure C7). While the general trends highlighted in the main text continue to hold, we find slightly smaller decreases in state employment and smaller increases in private employment due to state firms privatizing. Next, we continue to find positive effects of the BTA on entry for overall firms, particularly foreign and private domestic firms using contemporary ownership definitions (Figure C9). We also find that our firm count and employment results are robust to using these definitions (Figures C10 and C8 respectively).

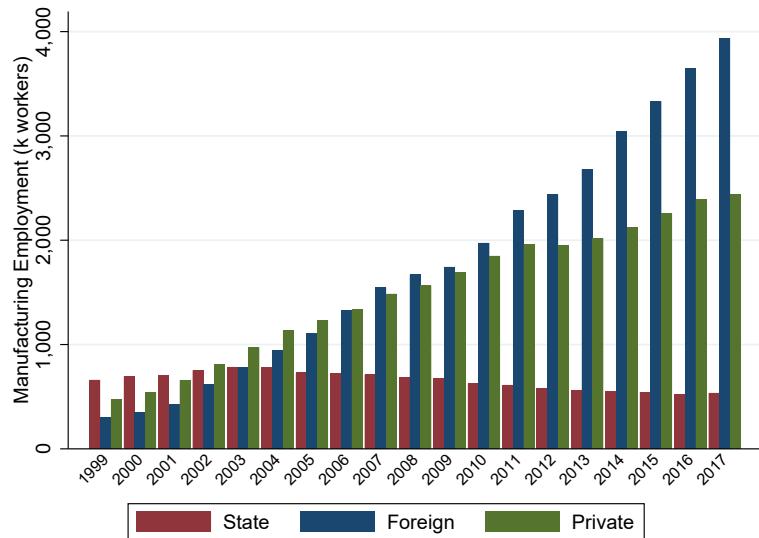


Figure C7: Vietnamese Manufacturing Employment by Initial Ownership Type, 1999 to 2017

*Note:* In thousands of workers. Source: Vietnam GSO and authors' calculations.

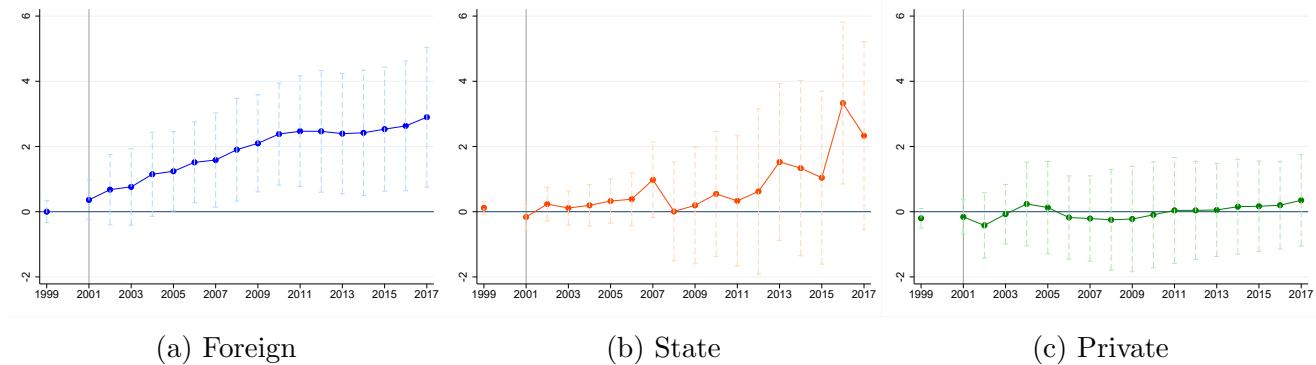


Figure C8: Employment by contemporary ownership and BTA tariffs, 1999-2017

*Note:* Firm-types are contemporary, as opposed to what was reported when the firms were initially observed. Each point reflects an individual regression coefficient from estimating equation (1) separately for each ownership type. The dependent variable is the log employment of firms in an industry for foreign (Panel (a)), state (Panel (b)), and private (Panel (c)), respectively. The BTA was implemented in 2001 (indicated by gray line) and the base year is 2000. The analysis is conducted at the 4-digit industry level. In separate ownership regressions for each panel, controls include 4-digit industry FE, year FE, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level.

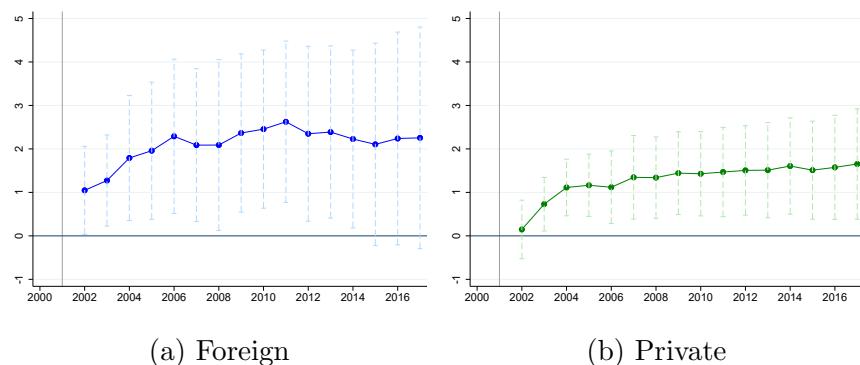


Figure C9: Number of entrants by contemporary ownership and BTA tariffs, 2000-2017

*Notes:* We define the cumulative number of entrants as the difference between the number of firms in year  $t$  and the number of those firms that were operating in 2000. Each point reflects an individual regression coefficient from estimating equation (1) separately for foreign and private in panels (a) and (b) respectively. The dependent variable is the ln cumulative number of entrants. The BTA was implemented in 2001 and the base year is 2001 due to our definition of entry (indicated by the gray line). The analysis is conducted at the 4-digit industry level. Controls include 4-digit industry FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

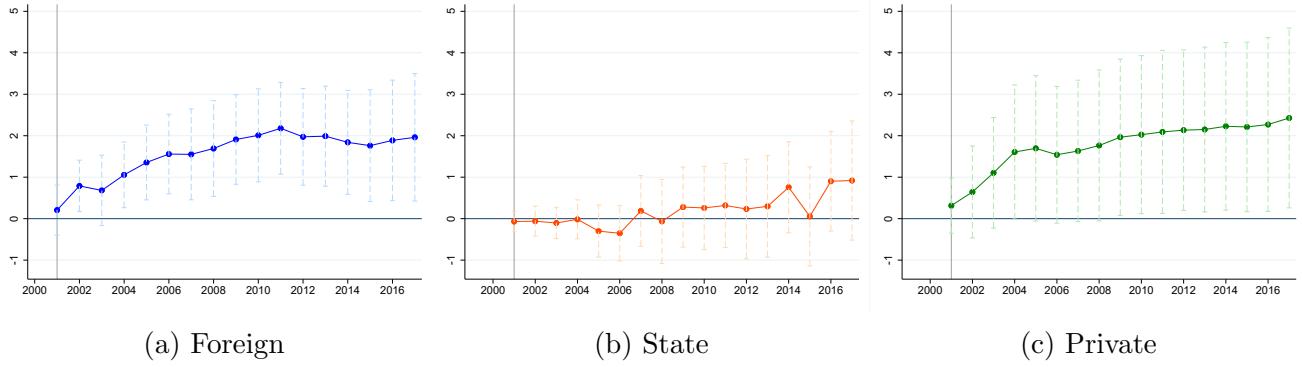


Figure C10: Firm count by contemporary ownership and BTA tariffs, 2000-2017

*Note:* Firm-types are contemporary, as opposed to what was reported when the firms were initially observed. Each point reflects an individual regression coefficient from estimating equation (1) separately for each ownership type. The dependent variable is the log number of firms in an industry for foreign (Panel (a)), state (Panel (b)), and private (Panel (c)), respectively. The BTA was implemented in 2001 (indicated by gray line) and the base year is 2000. The analysis is conducted at the 4-digit industry level. In separate ownership regressions for each panel, controls include 4-digit industry FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. Since we estimate equation (1) for each ownership type, this is equivalent to including ownership-year and ownership-industry FEs and allowing for ownership-specific coefficients on tariffs and industry-specific controls. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

## C.4 Robustness of employment share changes results

Our employment share changes results are robust to the exclusion and each inclusion of our controls (Figure C11). Additionally, these results are not sensitive to the omission of any one industry from our estimation (Figure C12).

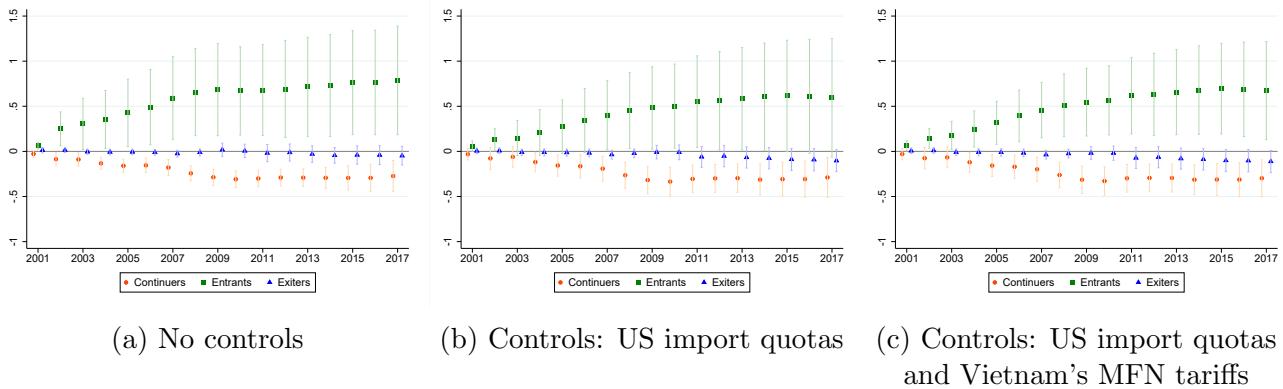
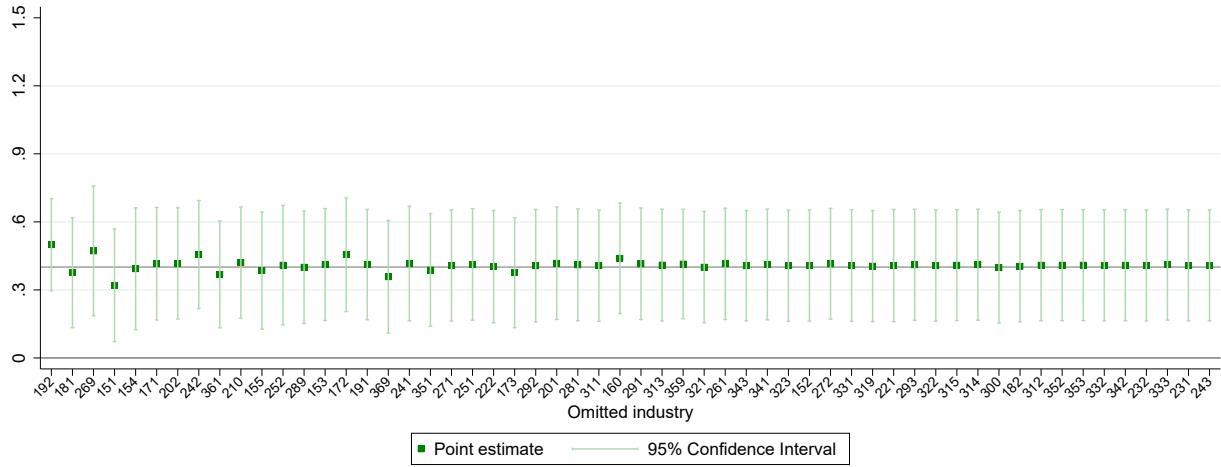
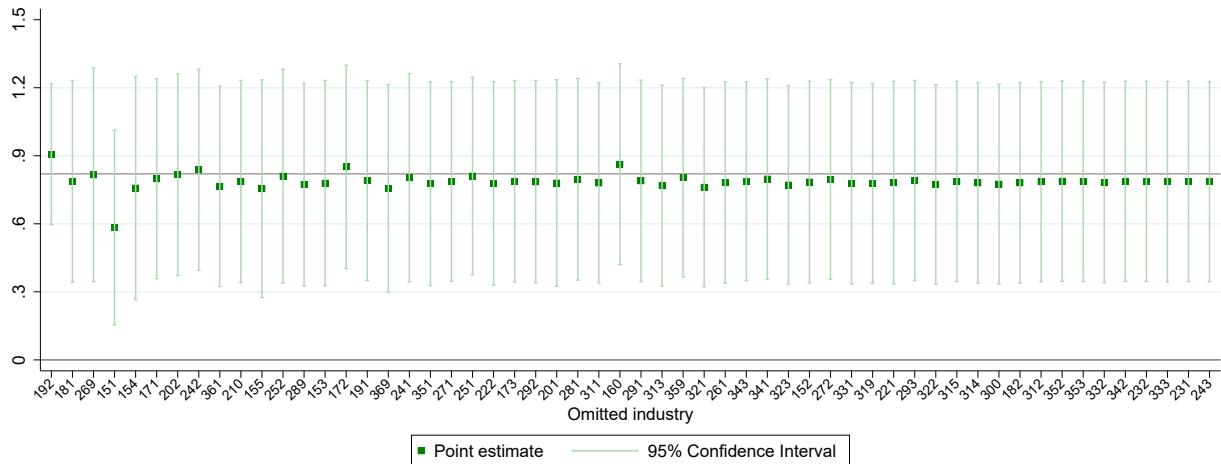


Figure C11: Changes in within-industry employment shares for foreign continuers, entrants, and exiters and BTA tariff cuts: Robustness to Controls

*Note:* The figures show the coefficients from estimating equation (2). The base year is 2000 and the observations are weighted by 2000 employment. All regressions are estimated at the 4-digit ISIC industry level with industry FEs and year FEs. Panel (a) includes no additional controls. Panel (b) controls for US import quotas on textiles and clothing applied to Vietnam and China respectively. Panel (c) controls for US import quotas on textiles and clothing applied to Vietnam and China respectively as well as the change in Vietnam's MFN tariffs due to WTO accession. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the industry level. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.



(a) Year 2006 Coefficient Estimate



(b) Year 2016 Coefficient Estimate

Figure C12: Estimate of change in employment share of foreign entrants and BTA tariffs with each industry omitted

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2), for year 2006 (Panel (a)) and year 2016 (Panel (b)), where each 3-digit industry on the x-axis is removed respectively. The 3-digit industries are sorted by total employment in year 2000 (largest on the left and smallest on the right). The base year is 2000 and the observations are weighted by 2000 employment. The analysis is conducted at the 4-digit industry level. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

## C.5 Robustness to alternative firm entry year

Our main definition of entry is consistent with the usual definition of entry in firm-level data sets (i.e., based on the panel nature of the data rather than a reported start date, which is less commonly available).

For some years of our data, the survey also reports the start of operations for a firm. As noted in Section [B.1.1](#), there are some discrepancies in the reported start year and the first year the enterprise appears in the data. The discrepancy may be due to a number of issues. First, as discussed previously, for private firms it may be due to starting in the informal sector and then subsequently transitioning to the formal sector. However, this explanation is unique to private firms as both state and foreign firms are required to register as an enterprise and thus operate in the formal sector. Hence, this explanation cannot explain why foreign and, in particular, state firms report a start year prior to appearing in the dataset. Second, it may be due to delays in the GSO updating its list of firms through communication with the tax office. Third, it may be due to confusion over how to respond to the question. This could apply in instances where an establishment decision or registration certificate was obtained prior to starting operations. Or it could be due to changes in ownership, most commonly privatization, within the firm over time.

Given that we are examining the cumulative effects of a policy that occurred at one point in time, it is unlikely that our results would be particularly sensitive to small changes in entry year. In addition, the above measurement error would need to be industry-specific and correlated with the U.S. tariff cuts. Nonetheless, we consider robustness of our main results reported in Figure [11](#) for foreign firms, as well as our results for state and private, Figure [D3](#), to two alternative definitions of entry.

First, we use an adjusted year of entry in the following way. For some entrants, they report both positive start of year employment in the first year they appear in the dataset and they report a start year prior to the first year they appear in the dataset. For these firms that first appear in the dataset in year  $t$  we redefine their entry year as  $t - 1$  and use start of year employment in year  $t$  as an estimate of end of year employment in year  $t - 1$ . We then replicate the main results from section [5](#) using this dataset with adjusted years of entry and estimated end of year employment in the adjusted entry year. The results are shown in Figure [C13](#) and are very similar to our main results.

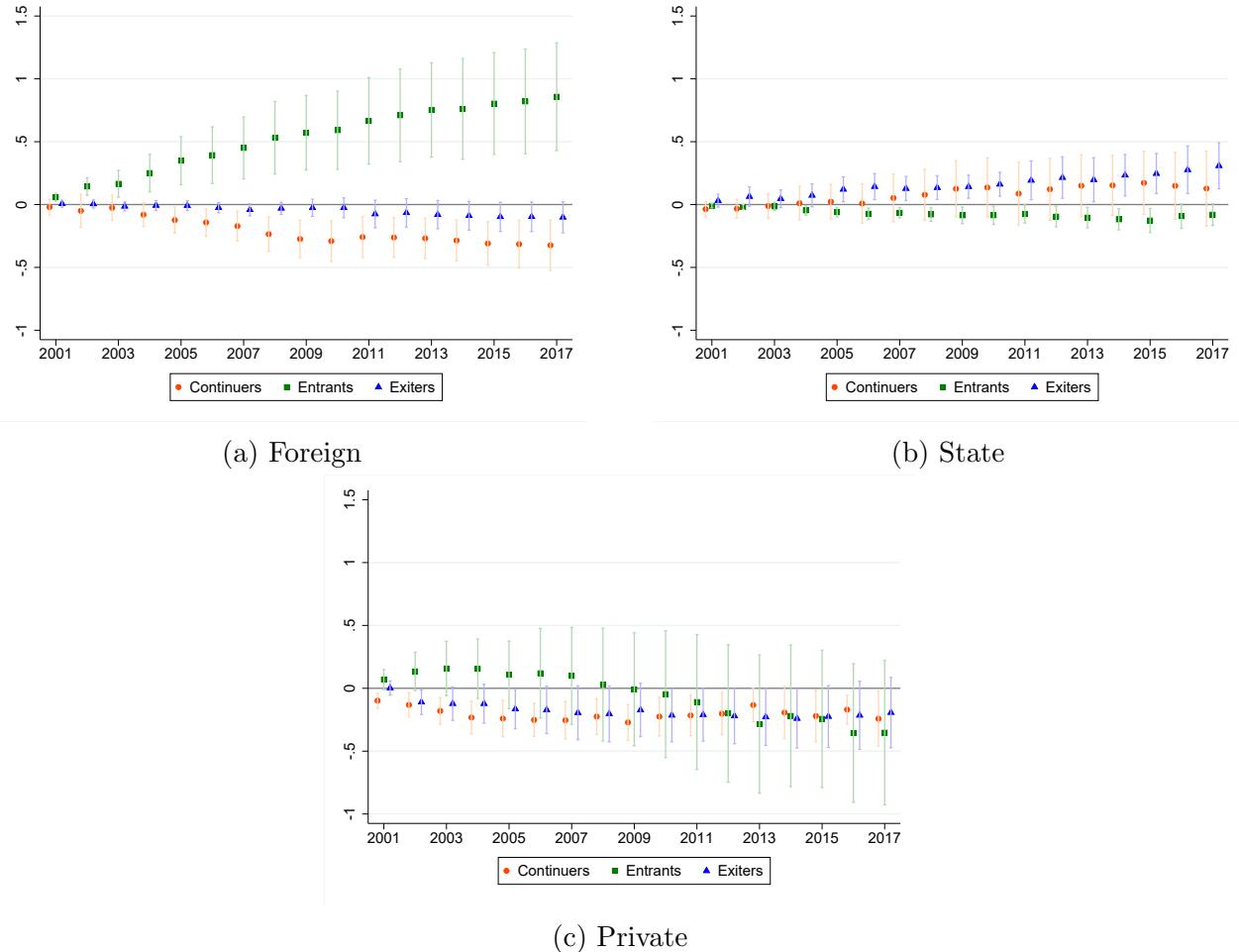


Figure C13: Change in within-industry employment shares by ownership post BTA using adjusted year of entry

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2). The base year is 2000 and the observations are weighted by 2000 employment. The analysis is conducted at the 4-digit industry level. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing. For entrants that report positive employment at the start of the year in the first year we observe them in the dataset, we assign their start year as being one year earlier and their end of year employment in that year as equal to their start of year employment in the following year. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

A second approach is to take the minimum reported start year as the actual entry year (i.e., assume there is no reporting error in the minimum reported start year). Since we do not observe employment for the enterprise prior to the year it enters the dataset, we use end of year employment in its first year in the dataset as an estimate for end of year employment for all years between measured entry and assumed entry based on the minimum reported start year. The results are shown in Figure C14 and they again are very similar to our main results.

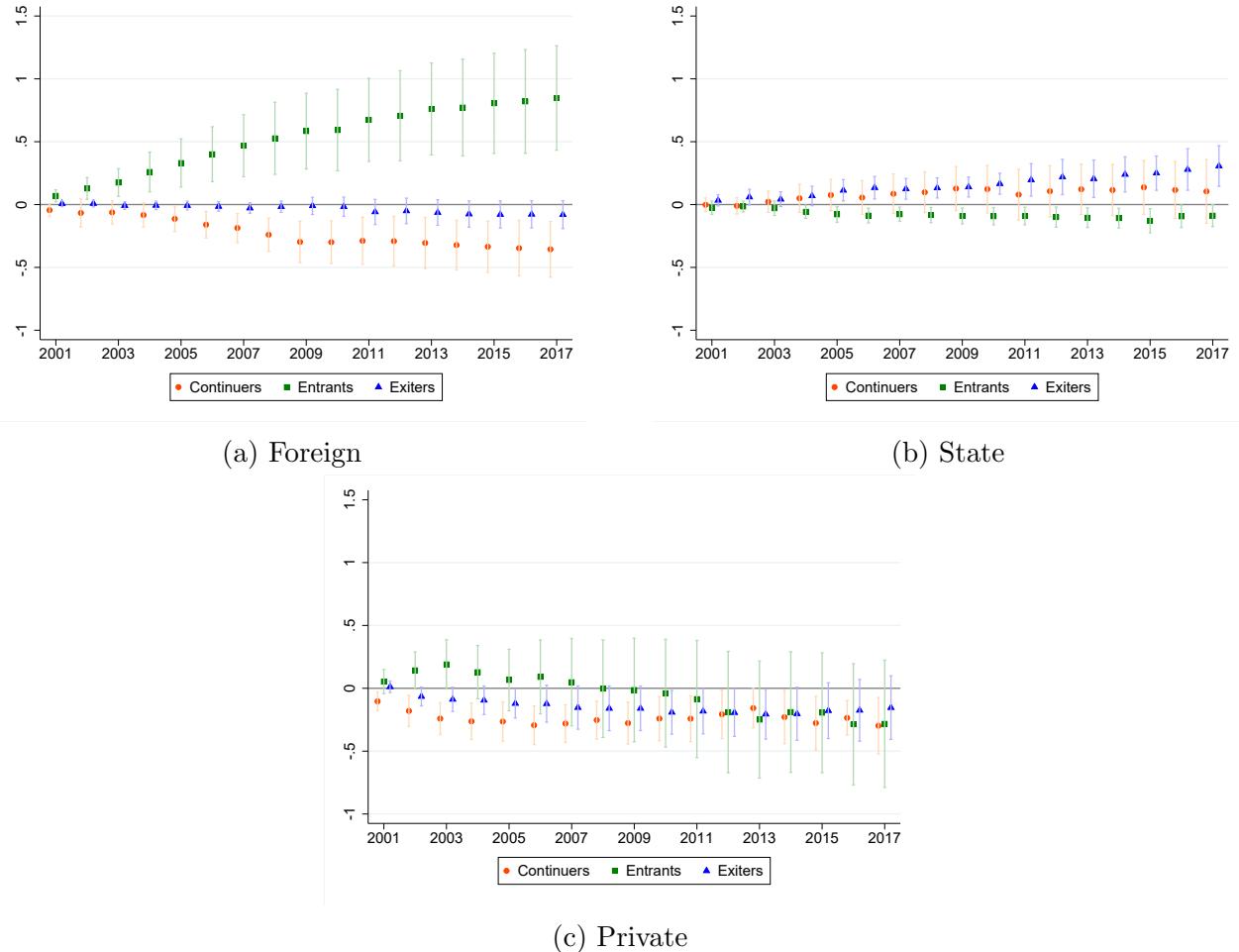


Figure C14: Change in within-industry employment shares by ownership post BTA using adjusted year of entry based on minimum reported start year

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2). The base year is 2000 and the observations are weighted by 2000 employment. The analysis is conducted at the 4-digit industry level. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing. We record each firm's start year as the minimum reported start year across all years that the firm appears in the dataset. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

## C.6 Pooled Regression Results

All specifications in the main text estimate year-by-year cumulative effects of the tariff declines, allowing the coefficients on tariffs to differ every year. In this subsection, we investigate the relationship between the U.S. tariff reductions and industry-level outcomes with specifications that pool some of the regression coefficients. In particular, we begin by estimating the following pooled regression model:

$$Y_{jt} = \Phi_1 \Delta BTA_j \mathbb{1}_{t=[2001,2008]} + \Phi_2 \Delta BTA_j \mathbb{1}_{t=[2009,2017]} + \lambda_j + \theta_t + \alpha_t C_{jt} + \varepsilon_{jt} \quad (3)$$

where  $Y_{jt}$  is industry  $j$ 's outcome in year  $t$  (e.g., ln firm count, ln employment, and ln revenue),  $\Delta BTA_j$  is the decrease in log US tariff applied to imports from Vietnam in industry  $j$  before and after the BTA, indicator  $\mathbb{1}_{t=(2001,2008)}$  equals one for years 2001-2008, indicator  $\mathbb{1}_{t=(2009,2017)}$  equals one for years 2009-2017,  $\lambda_j$  is industry fixed effects, and  $\theta_t$  is year fixed effects.  $C_{jt}$  are industry-specific controls for other trade policy changes and include US import quotas applied to clothing and textile imports from Vietnam and China respectively, Vietnam's MFN tariffs due to its WTO accession, and China-US exports in year  $t$ . BTA implementation year is 2001 and pre-BTA years 1999-2000 are the base years for the outcome changes. As such, the parameters of interest,  $\Phi_1$  and  $\Phi_2$ , estimate the impact of U.S. tariff reductions on the outcome variable for years 2001-2008 and 2009-2017, respectively, relative to the base years.

We begin by examining ln firm count, ln employment, and ln revenue for all ownership types, as reported in Table C6. We follow our analysis in the main text and conduct this analysis at the 4-digit industry level and all standard errors are clustered at the 4-digit industry level. First, we find that U.S. tariff reductions are associated with an increase in industry firm counts, employment, and revenue in years 2001-2008 relative to the base years. Second, the magnitude of these increases grows in the longer term from 2009-2017. This growth is consistent with our year-by-year results as well as traditional theories of international trade that predict the expansion of industry size in response to new exporting opportunities.

As is the case in the main analysis in Section 4, we find important differences in the response of industry outcomes when we focus on different ownership types. We estimate a version of equation (3) for each of the three ownership types  $o$  where  $o \in \{FDI, SOE, PRI\}$  :

$$Y_{jot} = \Phi_{1o} \Delta BTA_j \mathbb{1}_{t=(2001,2008)} + \Phi_{2o} \Delta BTA_j \mathbb{1}_{t=(2009,2017)} + \lambda_{jo} + \theta_{ot} + \alpha_{ot} C_{jt} + \varepsilon_{jot} \quad (4)$$

Table C6: Pooled regression at the industry level, 1999-2017

	(1) Firm Count	(2) Employment	(3) Revenue
Tariff Cuts $\times$ 2001-2008	1.299** (0.548)	1.079*** (0.304)	1.271*** (0.339)
Tariff Cuts $\times$ 2009-2017	2.401*** (0.910)	2.327*** (0.544)	1.967*** (0.559)
Observations	2087	2087	2087
R-squared	0.97	0.98	0.98

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Following equation (3), the first row reflects the regression coefficient  $\hat{\Phi}_1$  while the second row reflects the regression coefficient  $\hat{\Phi}_2$ . All regressions include year fixed effects and industry fixed effects. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

here  $Y_{jot}$  is the outcome for ownership type  $o$  in industry  $j$  at year  $t$ ,  $\Delta BTA_j$  is the change in log US tariff applied to imports from Vietnam in industry  $j$  before and after the BTA, indicator  $\mathbb{1}_{t=(2001,2008)}$  equals one for years 2001-2008, indicator  $\mathbb{1}_{t=(2009,2017)}$  equals one years 2009-2017,  $\lambda_{jo}$  is industry and ownership fixed effects, and  $\theta_{ot}$  is year and ownership fixed effects. The inclusion of ownership-year fixed effects controls for any firm-type-specific secular trends or government policies that might also contribute to the declining presence of state firms and increases in private and foreign firms.  $C_{jt}$  are industry-specific controls for other trade policy changes and include US import quotas applied to clothing and textile imports from Vietnam and China respectively, Vietnam's MFN tariffs due to its WTO accession, and China-US exports in year  $t$ . Similar to the previous specification, BTA implementation year is 2001 and pre-BTA years 1999-2000 are the base years for outcome changes. Hence, the coefficients  $\Phi_{1o'}$  and  $\Phi_{2o'}$  capture the BTA impact on outcomes for ownership  $o'$  during years 2001-2008 and 2009-2017 respectively relative to base years.

In Table C7 we report estimates of differential effects of the BTA across ownership types. Similar to the previous specification, in the years immediately after the BTA, foreign firms are significantly expanding in firm count and employment relative to the base year, 2000 (first and second panels, Column (1), Table C7). Foreign revenue is positively increasing but is noisy (third panel, Column (1), Table C7). In the subsequent period, the number of foreign firms, employment, and revenue continue to increase and are larger in magnitude. In the years immediately after the BTA, State firms experience a small but insignificant decline in numbers with increases in employment and revenue (Column (3) across all three panels, Table C7). In subsequent years,

SOE firms count, employment, and revenue experience positive growth but the coefficients are insignificant. PRI firms numbers are expanding in response to the U.S. tariff reductions initially and experiences a larger and statistically significant increase subsequently. However, its employment growth is noisy as is its revenue outcomes.

Table C7: Pooled regression by ownership-type, 1999-2017

	(1)	(2)	(3)
Firm Count	Foreign	Private	State
Tariff Cuts $\times$ 2001-2008	1.171*** (0.390)	1.431* (0.795)	0.00447 (0.134)
Tariff Cuts $\times$ 2009-2017	2.033*** (0.570)	2.469** (1.171)	0.307 (0.272)
Observations	1953	2062	1850
R-squared	0.98	0.97	0.99
	(1)	(2)	(3)
Employment	Foreign	Private	State
Tariff Cuts $\times$ 2001-2008	1.295** (0.546)	0.212 (0.569)	0.331 (0.259)
Tariff Cuts $\times$ 2009-2017	2.353*** (0.827)	0.755 (0.916)	1.024* (0.550)
Observations	1953	2062	1850
R-squared	0.98	0.98	0.98
	(1)	(2)	(3)
Revenue	Foreign	Private	State
Tariff Cuts $\times$ 2001-2008	0.625 (0.984)	0.273 (0.581)	0.955** (0.428)
Tariff Cuts $\times$ 2009-2017	1.669 (1.149)	-0.206 (0.916)	1.443** (0.688)
Observations	1951	2059	1850
R-squared	0.96	0.96	0.94

*Note:* \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Following equation (4), the first row reflects the regression coefficient  $\hat{\Phi}_{1o}$  while the second row reflects the regression coefficient  $\hat{\Phi}_{2o}$  for each ownership type  $o$  labelled in each column (Foreign, Private, and State). All regressions include year and ownership fixed effects, and industry and ownership fixed effects. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

Finally, we estimate the pooled impact of the U.S. tariff reductions on changes in within-industry changes in employment shares based on regression model (2). We pool all employment share changes relative to 2000 and interact the U.S. tariff reductions with two time periods, 2001 to

2008 and 2009 to 2017. Table C8 estimates the changes in of employment shares in response to the BTA across continuers, exiters, and entrants relative to year 2000. In the years immediately after the BTA, we find that industries with higher cuts in U.S. tariffs experience a significant increase in the the employment share of entering firms relative to lower tariff cut industries. The employment shares of continuing and exiting firms decline instead but are noisy. In subsequent years, the employment share of entrants continue to increase significantly while the shares of continuers and exiters also decrease but are noisy.

Table C8: Pooled employment share decomposition regressions, all owners

	(1) Continuers	(2) Entrants	(3) Exiters
Tariff Cuts $\times$ 2001-08	-0.289** (0.116)	0.312** (0.146)	-0.0227 (0.0776)
Tariff Cuts $\times$ 2009-17	-0.357** (0.168)	0.422** (0.208)	-0.0645 (0.126)
Observations	1954	1954	1954

*Note:* \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . We estimate a pooled version of equation (2) where we interact the US tariff reductions with two time periods, 2001 to 2008 and 2009 to 2017. All regressions include year fixed effects, the change in Vietnam's MFN tariffs due to WTO accession interacted with year fixed effects, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing interacted with year fixed effects. Standard errors are clustered at the 4-digit industry level. Weighted by year 2000 employment. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

Table C9 examines the tariff-induced employment share for foreign firms. Column (1) shows increases in the employment share of all foreign firms in industries with higher tariff cuts, initially and in subsequent years although the estimates are noisy. Columns (2) to (4) examine the responses of the employment share of foreign continuers, entrants, and exiters respectively to the BTA tariff cuts. We find that this overall increase in the foreign employment share is driven by a significant increase in foreign entrant employment share, initially and subsequently after the BTA (Column (3)). Foreign exiters are also significantly decreasing in employment share initially and subsequently (Column (4)). The employment share shift away from continuers was initially after the BTA, but subsequent decreases are statistically significant (Column (2)).

We further decompose the post-entry growth of foreign entrants into the change in employment share due to initial employment at entry and due to subsequent changes to employment after entry. Initially after the BTA, initial entry is more important than subsequent growth (columns (5) and (6) respectively, Table C9). However in subsequent years, more than half of the effect is driven by subsequent growth from foreign entrants (Column (6)).

Table C9: Pooled employment share decomposition regressions, foreign

	(1) All	(2) Continuers	(3) Entrants	(4) Exiters	(5) Entr-Init	(6) Entr-Chan
Tariff Cuts $\times$ 2001-08	0.171** (0.0855)	-0.139** (0.0544)	0.320*** (0.0861)	-0.0111 (0.0191)	0.191*** (0.0479)	0.129*** (0.0471)
Tariff Cuts $\times$ 2009-17	0.303* (0.160)	-0.324*** (0.0798)	0.693*** (0.197)	-0.0673 (0.0535)	0.339*** (0.0913)	0.358*** (0.119)
Observations	1954	1954	1954	1954	1954	1954

*Note:* \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . We estimate a pooled version of equation (2) where we interact the US tariff reductions with two time periods, 2001 to 2008 and 2009 to 2017. All regressions include year fixed effects, the change in Vietnam's MFN tariffs due to WTO accession interacted with year fixed effects, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing interacted with year fixed effects. Standard errors are clustered at the 4-digit industry level. Weighted by year 2000 employment. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

Table C10 examines the tariff-induced employment share change for state firms. Column (1) shows a relative increase in the employment share of all state firms in higher tariff cut industries initially and in subsequent years although the estimate is noisy. Columns (2) to (4) examine the tariff cut responses of the employment share of SOE continuers, entrants, and exiters respectively. Immediately after the policy, we find a significant decrease in the employment share of entrants and increase in share of exiters in higher cut industries. Continuer shares increase but is noisy. In subsequent years, exiters continue to see a significant share increase in higher cut industries. Entrant shares continue to decrease while continuer share increases but are noisy. Given that SOE dynamics are driven by firm exit (state firm employment is decreasing over this period), we find delayed state employment share responses in industries with higher tariff cuts. SOE entrants are entering slower in higher cut industries relative to less affected industries, while SOE exits are increasing in the opposite industries—with lower tariff cuts.

Table C11 examines the tariff-induced employment share for private firms. Column (1) shows significant decreases in the employment share of all private firms in industries with higher tariff cut, initially and in subsequent years. Columns (2) to (4) examine the responses of the employment share of private continuers, entrants, and exiters respectively to the BTA tariff cuts. The overall decrease in private employment shares is driven by a significant decrease in continuers, initially after the BTA and subsequently (Column (2)). The employment share of private exiters is also significantly decreasing immediately after the BTA while its subsequent decrease is noisy. The private entrant share is imprecisely estimated.

Table C10: Pooled employment share decomposition regressions, state

	(1) All	(2) Continuers	(3) Entrants	(4) Exiters
Tariff Cuts $\times$ 2001-08	0.0550 (0.0868)	0.0339 (0.0785)	-0.0705* (0.0369)	0.0916** (0.0370)
Tariff Cuts $\times$ 2009-17	0.269 (0.164)	0.172 (0.140)	-0.111** (0.0464)	0.208*** (0.0727)
Observations	1954	1954	1954	1954

*Note:* \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . We estimate a pooled version of equation (2) where we interact the US tariff reductions with two time periods, 2001 to 2008 and 2009 to 2017. All regressions include year fixed effects, the change in Vietnam's MFN tariffs due to WTO accession interacted with year fixed effects, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing interacted with year fixed effects. Standard errors are clustered at the 4-digit industry level. Weighted by year 2000 employment. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

Table C11: Pooled employment share decomposition regressions, private

	(1) All	(2) Continuers	(3) Entrants	(4) Exiters
Tariff Cuts $\times$ 2001-08	-0.226* (0.122)	-0.184*** (0.0645)	0.0617 (0.167)	-0.103 (0.0723)
Tariff Cuts $\times$ 2009-17	-0.572** (0.238)	-0.206** (0.0829)	-0.161 (0.289)	-0.205* (0.113)
Observations	1954	1954	1954	1954

*Note:* \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . We estimate a pooled version of equation (2) where we interact the US tariff reductions with two time periods, 2001 to 2008 and 2009 to 2017. All regressions include year fixed effects, the change in Vietnam's MFN tariffs due to WTO accession interacted with year fixed effects, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing interacted with year fixed effects. Standard errors are clustered at the 4-digit industry level. Weighted by year 2000 employment. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

## D Additional Results

### D.1 Additive decomposition of employment growth

In this section we an additional dependent variable, industry employment growth, which like within-industry employment shares, can be additively decomposed by ownership and firm status (continuers, entrants, and exiters). In particular, we consider the long difference between 2000 and 2017. Our dependent variable is the growth in industry employment defined as:

$$g_j = \frac{L_{j,2017} - L_{j,2000}}{L_{j,2000}} \quad (5)$$

Unlike  $\ln$  employment (Figures 7a and 8), this variable can be additively decomposed along multiple margins. For example, we can decompose it into continuers, entrants, and exiters as follows:

$$g_j = \frac{L_{j,2017}^{Continuers} - L_{j,2000}^{Continuers}}{L_{j,2000}} + \frac{L_{j,2017}^{Entrants} - L_{j,2000}^{Entrants}}{L_{j,2000}} - \frac{L_{j,2017}^{Exiters} - L_{j,2000}^{Exiters}}{L_{j,2000}} \quad (6)$$

where the superscripts *Continuers*, *Entrants*, and *Exiters* use the same definitions as in section 5. Specifically, continuers are firms that operated in both 2000 and 2017, entrants are firms that entered after 2000, and exiters are firms that operated in 2000 but had ceased doing so prior to 2017. This decomposition gives us an interpretation of how much of the overall growth was due to employment changes within continuers, due to entrants, and due to exiters. Similarly, we can decompose it into foreign, state, and private as follows:

$$g_j = \frac{L_{j,2017}^{Foreign} - L_{j,2000}^{Foreign}}{L_{j,2000}} + \frac{L_{j,2017}^{State} - L_{j,2000}^{State}}{L_{j,2000}} + \frac{L_{j,2017}^{Private} - L_{j,2000}^{Private}}{L_{j,2000}} \quad (7)$$

where the superscripts *Foreign*, *State*, and *Private* use initial ownership as we use throughout the paper. This decomposition gives us an interpretation of how much of the overall growth was due to employment changes within foreign, state, and private firms. Lastly, we can additively decompose total industry growth into 9 terms which represent the 3x3 combinations of ownership (foreign, state, and private) and status (continuers, entrants, and exiters).

In Table D1, we report coefficients from estimating equation (2) for long run growth between 2000 and 2017 with the overall growth rate and its additive components described above. As in Table 2, the results are additive across columns and rows. However, unlike Table 2 there is

Table D1: Long run industry employment growth by ownership and firm status

	All	Foreign	State	Private
Total	12.914*** (2.988)	9.465*** (2.560)	0.651*** (0.147)	2.798** (1.170)
Continuers	0.870*** (0.333)	0.252 (0.315)	0.447*** (0.113)	0.170** (0.067)
Entrants	12.072*** (2.931)	9.330*** (2.465)	-0.062 (0.095)	2.804** (1.213)
Exiters	-0.027 (0.152)	-0.117* (0.065)	0.266*** (0.090)	-0.176 (0.134)

*Note:* \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Each coefficient represents an estimate of  $\beta_{ost}$  from equation (2). The dependent variable is the growth in industry employment between 2000 and 2017 additively decomposed as per each row-column combination. The analysis is conducted at the 4-digit industry level and the observations are weighted by 2000 employment. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in ln Chinese exports to the US in 2017 relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

a coefficient estimate for Total-All. Consistent with results in Figure 7a, we estimate a positive effect of the US tariff reductions on industry employment growth in the first row of column (1). Next, focusing on the first row, we estimate that foreign employment accounted for 73% of overall growth (9.46/12.91). This is consistent with the results of Figure 8 which show ln employment in foreign firms increased more than for state or private firms. Within column 1, we show that entrants accounted for almost the entire aggregate growth response, 93.4% (12.07/12.91). This is consistent with the results in Figure D2 which show that the within-industry employment share shifted toward entrants in response to the U.S. tariff reductions. Turning now to the 3x3 margins of adjustment, the results highlight that foreign entrants accounted for 72% (9.33/12.91) of aggregate industry employment growth. This is consistent with our results in Figure 11 that demonstrate the large within industry employment shift toward foreign entrants due to the U.S. tariff reductions. The contribution is much smaller for private and state entrants. Additionally, these results show that continuers contributed very little to aggregate growth, consistent with results in Figure D9, which shows more muted response of ln employment among continuing firms as compares to Figures 7a and 8.

Unlike in Table 2, these results have a level interpretation. For example, while foreign continuers are losing employment share within industries in response to the U.S. tariff reductions, as reported in Table 2, the results above suggest that this is not due to a level effect. They are losing employment share within industry due to the rapid expansion of foreign entrants.

## D.2 Additional results for state and private firms

### D.2.1 BTA and Number of Firms, Entry, and Employment

**Number of firms and entry** To examine how the BTA-induced tariff reductions impact firm counts, we estimate equation (1) for the ln number of firms as a dependent variable for each ownership type, with estimates of the coefficients on tariffs presented in Figure D1. Tariff cuts are associated with an increased number of foreign firms (Figure D1a). The cumulative positive effect on number of foreign firms levels off 8 to 10 years after the BTA, such that the number of foreign firms grew by approximately 0.48 ln points (62%) in response to the mean U.S. tariff reduction. Notice that the cumulative positive effect on the number of foreign entrants levels off 8 to 10 years after the BTA, whereas the cumulative effects on foreign employment continue to grow over time, suggesting that employment growth moves from the extensive (firm entry) to intensive margin (post-entry growth). See Section 5.2 for further analysis.

While U.S. tariff cuts are associated with increased number of private firms, the cumulative effect tapers off sooner—four years following the agreement, with gradual increases thereafter (Figure D1c). On entry, we find similar positive but smaller effects for the private firms (Figure 9c).<sup>23</sup> A small share of private domestic entry could reflect formalization (see discussion in Section 3).

At the onset of the BTA, state firms accounted for 47% of employment in formal manufacturing. We therefore examine the effects of trade policy on state firms over a long period in a setting that starts off with a higher presence of state firms than in other studies (Khandelwal, Schott and Wei, 2013; Brandt et al., 2017; Baccini, Impullitti and Malesky, 2019). While the number of state firms is decreasing in the aggregate, we find no statistically significant relationship between the tariff cuts and changes in the number of state firms (Figure D1b). The magnitudes of the coefficients for state firms become slightly positive 8 to 10 years after the BTA, suggesting a smaller contraction in the number of state firms in high tariff-cut industries, but the magnitudes are substantially smaller than for foreign and private firms and insignificant.<sup>24</sup> We do not separately analyze entry

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<sup>23</sup>These results are robust to using contemporary ownership (Appendix Figure C9).

<sup>24</sup>The main results in Figure D1 are robust to classifying firms by contemporary ownership rather than time-invariant ownership based on the first year the firm is observed in the data (Appendix Figure C10). The two mainly differ for state firms due to privatization, with fewer state firms using contemporary relative to initial ownership (compare Figures 2 and C7). The coefficients on tariff cuts for state firms are more muted with initial than contemporaneous ownership, suggesting that state firms are less likely to privatize in industries with bigger tariff cuts.

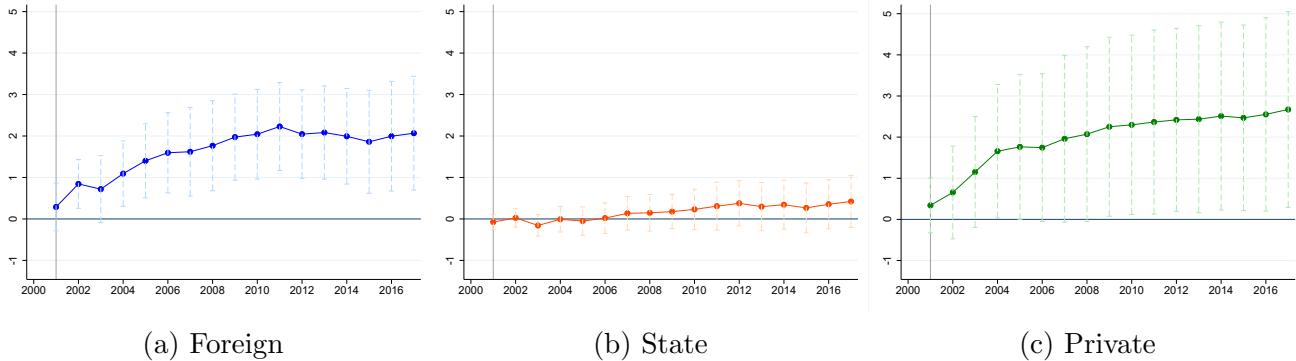


Figure D1: Firm count by ownership and BTA tariffs, 2000-2017

*Note:* Each point reflects an individual regression coefficient from estimating equation (1) separately for each ownership type. The dependent variable is the ln annual number of firms in an industry for foreign (Panel (a)), state (Panel (b)), and private (Panel (c)), respectively. The BTA was implemented in 2001 (indicated by the gray line) and the base year is 2000. The analysis is conducted at the 4-digit industry level. In separate ownership regressions for each panel, controls include 4-digit industry FE, year FE, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

of state firms because it is relatively rare, but incorporate that margin in analysis in Section 5.

**Employment** In the main text, we find that tariff cuts are associated with increased employment in foreign firms (Figure 8a). On the other hand, while tariff cuts are associated with increased private firm entry and increased number of private firms, tariff cuts are not associated with statistically significant increases in their employment (Figure 8c). The coefficients on tariffs are positive, but small in magnitude and very noisy. As discussed in the main text, this finding is consistent with the lack of employment growth in domestic firms in lower-income countries (Hsieh and Klenow, 2014).

The positive (albeit noisy) coefficients for state firms in Figure 8b suggest that they experience a steady, albeit imprecise, smaller contraction in employment in industries with larger tariff cuts.<sup>25</sup> Because aggregate state employment is declining, the positive coefficient implies slower declines in state employment in high tariff-cut industries. The lack of response to tariff cuts in terms of firm count and slower contraction of employment is consistent with state firms being less responsive to trade reform than foreign firms, perhaps due to different market incentives discussed in Section 2.4. This is further confirmed by delayed employment share changes in high tariff-cut industries due to stalled privatization. In particular, the coefficients on tariff cuts in the state

<sup>25</sup>When we pool results into 8-year periods, we find a statistically significant positive coefficient in state employment from 2009-2017 (Appendix Table C7). See Appendix Section C.6 for further details.

employment regressions are more muted with initial than contemporaneous ownership (see Figure C8), suggesting even slower employment declines in high-cut industries due to less privatization in these industries.<sup>26</sup> As such, our findings of slow adjustment of state contraction and employment with increased export market access adds to the literature on trade policy and state firms, where the empirical work has mainly focused on lack of adjustment of state firms to increased import competition.<sup>27</sup>

### D.2.2 Within-industry employment shares

US tariff cuts lead to a pronounced expansion of the within-industry employment share of entrants. Figure D2 reports the estimates of the coefficients on tariff cuts from Equation (2) for continuers, exiters, and entrants (while abstracting from firm ownership). Declines in US tariffs are associated with a large increase in the employment share of entering firms, a decline in the employment share of continuers, and no significant change in the employment share of exiting firms. The mean reduction in  $\ln$  tariffs was 0.24. This implies that entrants in an industry that received the mean tariff reduction expanded their employment share by 7.8 percentage points by 2004, only 3 years after implementation, relative to entrants in an industry that received no tariff reductions. This estimated tariff-cut induced change in employment share continued to grow to about 11.8 percentage points by 2009 and then remained relatively unchanged. This increase is offset by declines in the employment share of continuers by 10.9 percentage points respectively by 2009, with no noticeable tariff-induced change in employment share of exiting firms.

It is instructive to compare the tariff-cut induced changes in within industry employment shares of foreign affiliates to results for state and private firms by the three margins of adjustment. Recall from Figure 10, tariff cuts were associated with smaller contraction in the state employment share (albeit at times noisily estimated) and decreases in employment shares of private firms. Figures D3a and D3b report the estimates of the coefficients on tariff cuts from Equation (2) for state and private by status, respectively. The magnitudes of the coefficients on tariffs are smaller than for foreign entry and imprecisely estimated.

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<sup>26</sup>Our employment results are robust to using contemporary ownership information for foreign and private firms (Figures C8. For comparison purposes, we also examine the link between tariff cuts and revenue and find differential responses by firm ownership, with the most pronounced (albeit noisy) increase in revenue in foreign firms and decline in private revenue (results available upon request)

<sup>27</sup>Brandt et al. (2017) and Baccini, Impullitti and Malesky (2019) find that state firms are not subject to the same competitive pressures due to increased import competition in response to WTO accession in China and Vietnam, with state firms less likely to exit in response to import tariff cuts relative to domestic firms.

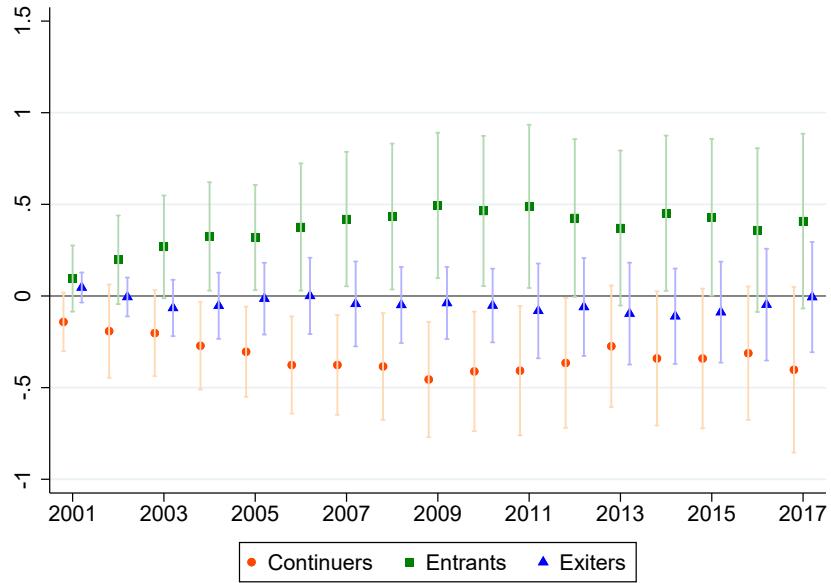
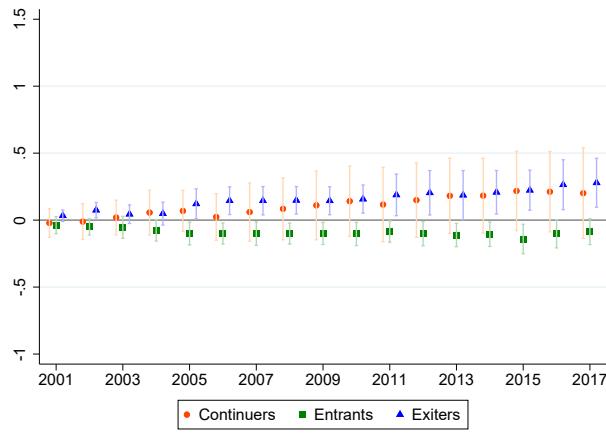


Figure D2: Changes in within-industry employment shares for continuers, entrants, and exiters and BTA tariff cuts

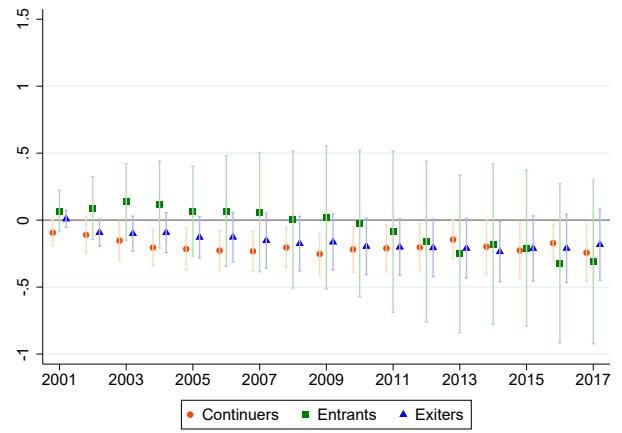
*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2). The base year is 2000 and the observations are weighted by 2000 employment. Controls included in the regression are the change in Vietnam's MFN tariffs due to WTO accession, the change in ln Chinese exports to the US in year  $t$  relative to 2001, and an industry measure of US imports quotas applied to Vietnamese exports of textiles and clothing. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

Recalling that overall employment shares in state firms is contracting during this period, the positive coefficients on tariff cuts for state continuers and exiters reflect slower contraction among continuers and less employment contraction through exit for state firms in industries with higher tariff cuts relative to less affected industries. For private firms, tariff-induced increased entry of private firms noted in earlier analysis does not translate into sustained gains in employment shares within industries, relative to foreign and state firms. We show in Figure D3b that tariff cuts induced employment to shift away from private firms due to a combination of declines in employment shares of continuers, entrants, and exiters, albeit each channel is individually imprecisely estimated.<sup>28</sup>

<sup>28</sup>The negative coefficient on the entry might be puzzling at first. Recall from Section 4 that tariff cuts are associated with increased entry of private firms. In addition, the magnitudes of the coefficients on tariff cuts for employment effects for private firms is positive, but substantially smaller in magnitude (and statistically insignificant) than for foreign firms (see Figure 8). Hence the negative coefficients mainly reflect relative expansion of foreign firms (and smaller contraction of state firms) in high tariff-cut industries rather than an absolute decline in employment among private entrants.



(a) State



(b) Private

Figure D3: Changes in within-industry employment shares for state and private continuers, entrants, and exiters and BTA tariff cuts

*Note:* Each point reflects an individual regression coefficient,  $\beta_{ost}$ , following equation (2). The base year is 2000 and the observations are weighted by 2000 employment. The analysis is conducted at the 4-digit industry level. Controls include the change in Vietnam's MFN tariffs due to WTO accession, the change in ln Chinese exports to the US in year  $t$  relative to 2000, and industry measures of US import quotas applied to Vietnamese and Chinese exports of textiles and clothing. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

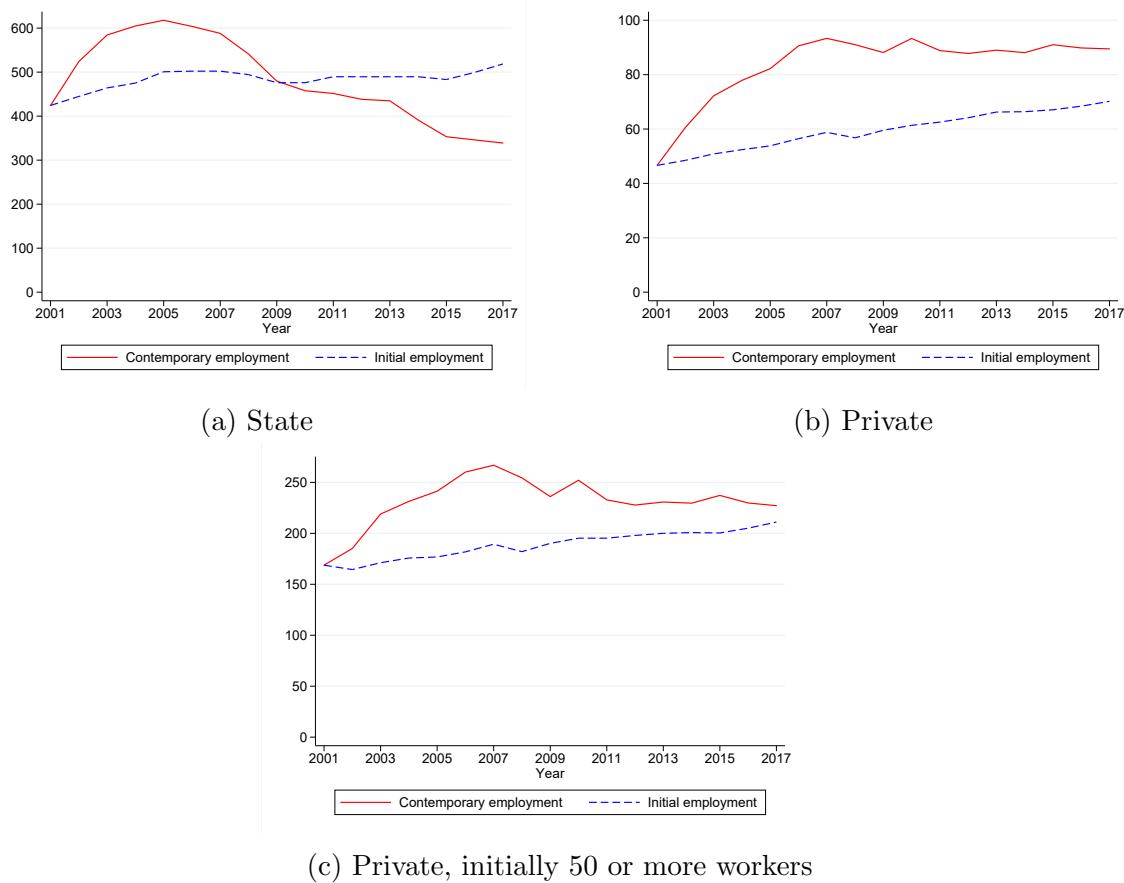


Figure D4: Contemporary and initial employment among surviving state and private entrants, 2001 entry cohort

*Note:* Figure (a) reports mean employment among state-owned enterprises that entered in 2001. For each year after 2001, the figure reports mean contemporary employment and mean initial employment among surviving members of the 2001 entry cohort. Figure (b) shows the same analysis for private enterprises that entered in 2001 and Figure (c) shows private entrants in 2001 that employed 50 or more workers. Source: Vietnam GSO and authors' calculations.

### D.3 Additional results for exporters, FDI sources, and related-party trade

In this section we include additional results for Section 6, which shows that the observed association between tariff cuts, foreign firm entry, and subsequent employment growth among foreign entrants is closely linked to exporting, particularly of foreign firms. We also include results that further examine the origin countries of FDI that are driving these responses. The BTA tariff cuts induced an increase in the employment share of foreign entrants, and foreign entrants that are exporters drive this increase. This is shown in Figure D5 which breaks down the results in Figure 12a by separately tracking initial and post-entry employment of the cohort of foreign firms that entered in 2001, split into those that exported in 2002 and those that did not export. While the focus here is on exporter status in 2002 because that is the first year in which firms report exporting status, we find similar results for entry and export cohorts of other years (Figure D6). Figure D7 reports the shares and levels of Vietnamese related party and non-related party exports to the U.S.

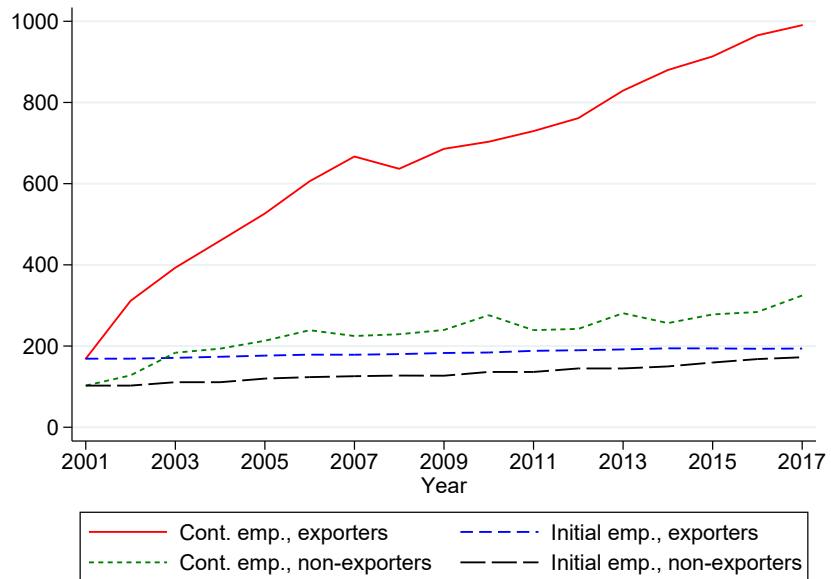


Figure D5: Employment growth for 2001 foreign entry cohort by export status

*Note:* The figure shows contemporary employment and initial employment among foreign firms that enter in 2001 and that have survived to each year  $t$ . The entry cohort is split based on export status in 2002. We use export status in 2002 since this information is not available in 2001. Source: Vietnam GSO and authors' calculations.

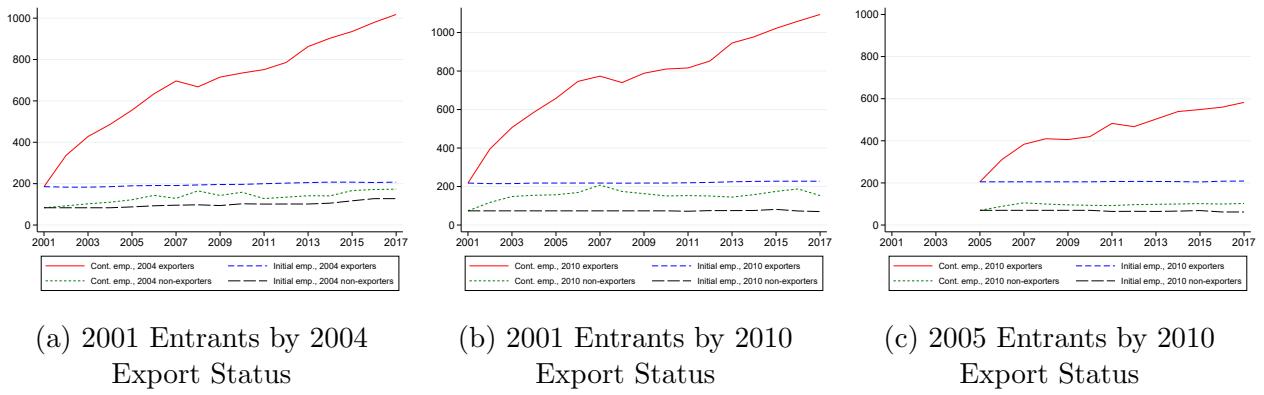


Figure D6: Employment growth for foreign entry cohort by export status, multiple years

*Note:* Panel (A) shows contemporary employment and initial employment among foreign firms that enter in 2001 and that have survived to each year  $t$ . The entry cohort is split based on export status in 2004. Panel (B) shows contemporary employment and initial employment among foreign firms that enter in 2001 and that have survived to each year  $t$ . The entry cohort is split based on export status in 2010. Panel (C) shows contemporary employment and initial employment among foreign firms that enter in 2005 and that have survived to each year  $t$ . The entry cohort is split based on export status in 2010. Source: Vietnam GSO and authors' calculations.

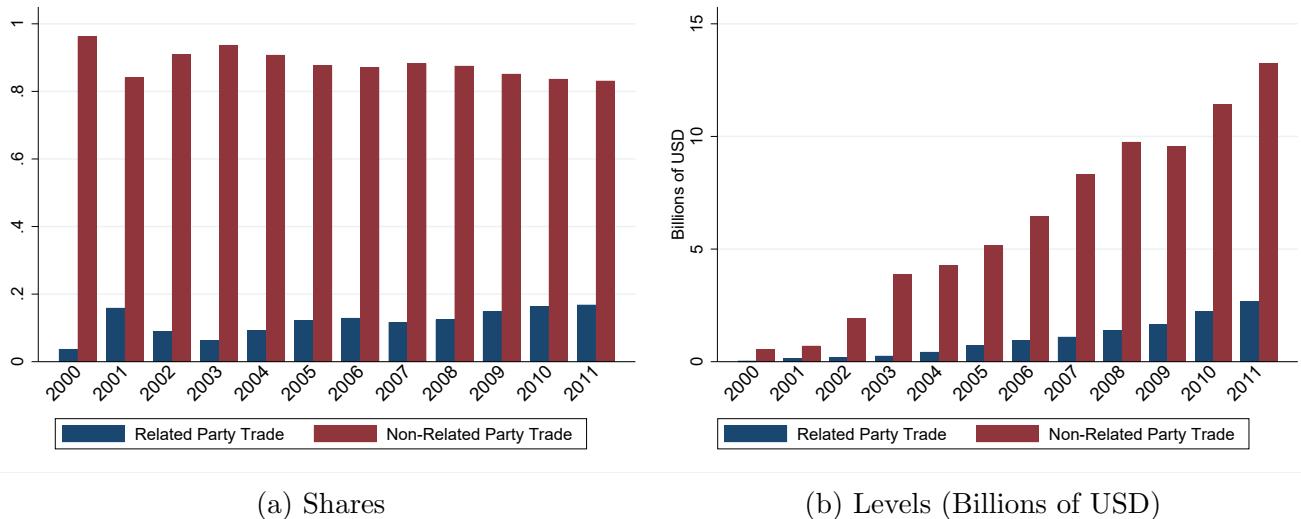


Figure D7: Vietnam-US Exports from US and non-US Affiliates, 2000-2011

*Note:* Panel (a) reports the share of Vietnamese exports to the US by US and non-US affiliates. Exports by US affiliates are also known as Related Party Trade. These are transactions which includes any person directly or indirectly owning, controlling, or holding with power to vote,  $\geq 5\%$  of the outstanding voting stock or shares of any organization and such organization (US Census Bureau). Panel (b) reports the levels of these exports. Source: Antras (2016), USITC, and authors' calculations.

## D.4 Additional results for continuers

In this subsection we provide additional results for continuing firms. We focus on firms that operated continually throughout the period 2000 to 2017 inclusive. First, we show how average employment in these firms has evolved over time. Second, we show how industry employment in continuers responded to the U.S. tariff reductions.

Figure D8 plots mean employment by year for firms that continually operate from 2000 through 2017 inclusive. Mean employment was about 400 workers in 2000 in foreign continuers and this grew steadily over time, more than doubling by the end of the period. The sustained growth is similar to, although not as rapid as for foreign entrants (Figure 12a). While state continuers started larger on average than foreign continuers, after a brief period of growth they contracted in size over the long run. Lastly, mean employment in private continuers showed little aggregate change in the long run.

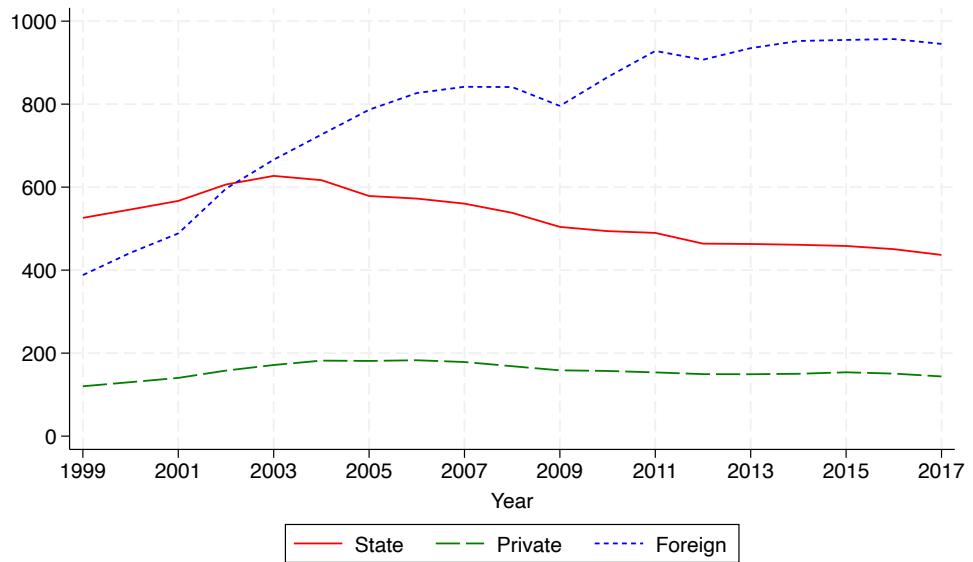


Figure D8: Average employment over time among continuing firms

Note: The figure reports mean employment among firms that continually operated from 2000 through 2017. Ownership categories are based on the firms' reported ownership in 2000. Source: Vietnam GSO and authors' calculations.

Figure D9 reports coefficient estimates from regressions equivalent to those shown in Figures 7a and 8 except that the set of firms is restricted to continuers. First, comparing Figures D9a and 7a, we see that expansion in industry employment in response to the U.S. tariff reductions is positive for continuers, but the long run effect is appreciably smaller than when all firms are included. Turning to each of the panels by ownership, the estimates for continuing firms are consistently

positive, but small in magnitude, and not typically statistically different from 0. Hence, there is not strong evidence of an expansion in industry employment within continuers when looked at separately by ownership.

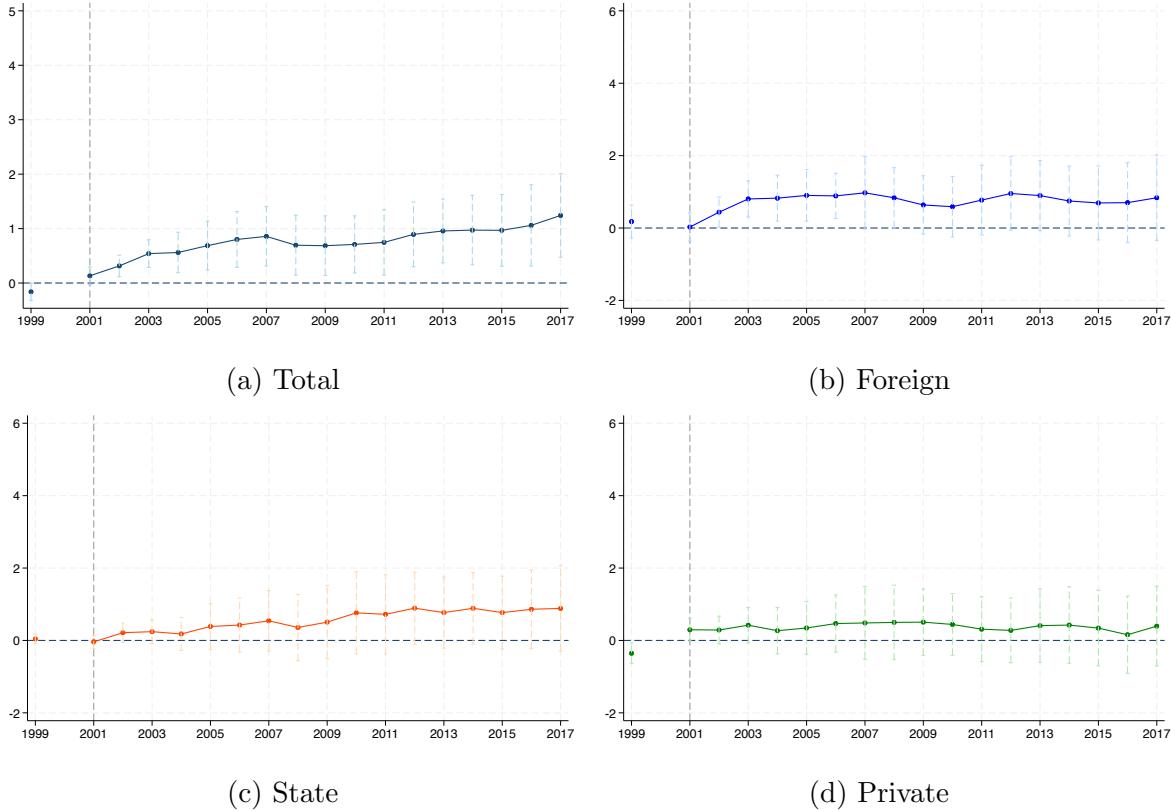


Figure D9: Employment in continuing firms by ownership and BTA tariffs, 1999-2017

*Note:* Each point reflects an individual regression coefficient from estimating equation (1) separately for each ownership type where the set of firms is restricted to those continually operating between 2000 and 2017, and the independent variable is the change in U.S. tariff applied to Vietnamese exports in an industry before and after the BTA ( $\Delta BTA_j$ ). The dependent variable is the log annual employment in an industry for all ownership categories in Panel (a), for foreign in Panel (b), state in Panel (c), and private in Panel (d). The BTA was implemented in 2001 (indicated by the gray line) and the base year is 2000. The analysis is conducted at the 4-digit industry level. In separate ownership regressions for each panel, controls include 4-digit industry FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.

## D.5 Additional results on exit

In this subsection, we explore how the U.S. tariff reductions affect firm exit. We define the cumulative number of exiters as the difference between the number of firms in year 2000 and the number of those firms that have survived to year  $t$ . Overall, the positive but noisy estimates in Figure D10a suggest that industries with large tariff cuts are associated with an increase in exiters, but the magnitude is relatively small (as compared to entry in Figure 9) and not statistically different from 0. Additionally, we find differential exit rates for each ownership type. For foreign firms, we find positive but noisy estimates which increase over time (Figure D10b). The estimates for private (Figure D10d) mirror those for overall, consistent with private firms being the majority of firms in operation in 2000 (Table 1) and hence heavily influencing the overall results.

The state firm results tell a different story (Figure D10c). The number of state exiters is negative and statistically significant, suggesting that industries with large tariff cuts are associated with fewer state exiters. In fact, this impact becomes larger over time. The cumulative effects of the U.S. tariff reductions on exit of state firms decrease by about 0.55 ln points (42%) in 2007 after 6-7 years, after which they continue to decrease but at a slower rate to about 0.75 ln points (53%) in 2017 at the end of our sample period. In Figure D10c, the coefficients on tariffs imply an elasticity of exit with respect to tariff of -1.24 in the short run 1 year post-BTA (2002) and -2.79 in the long run after 12 years (2013). These negative exit rates for state firms are in stark contrast to our findings for the other ownership types, further suggesting that they face different competitive pressures than other firms and emphasizing to our contribution to the literature on trade policy and state firms.

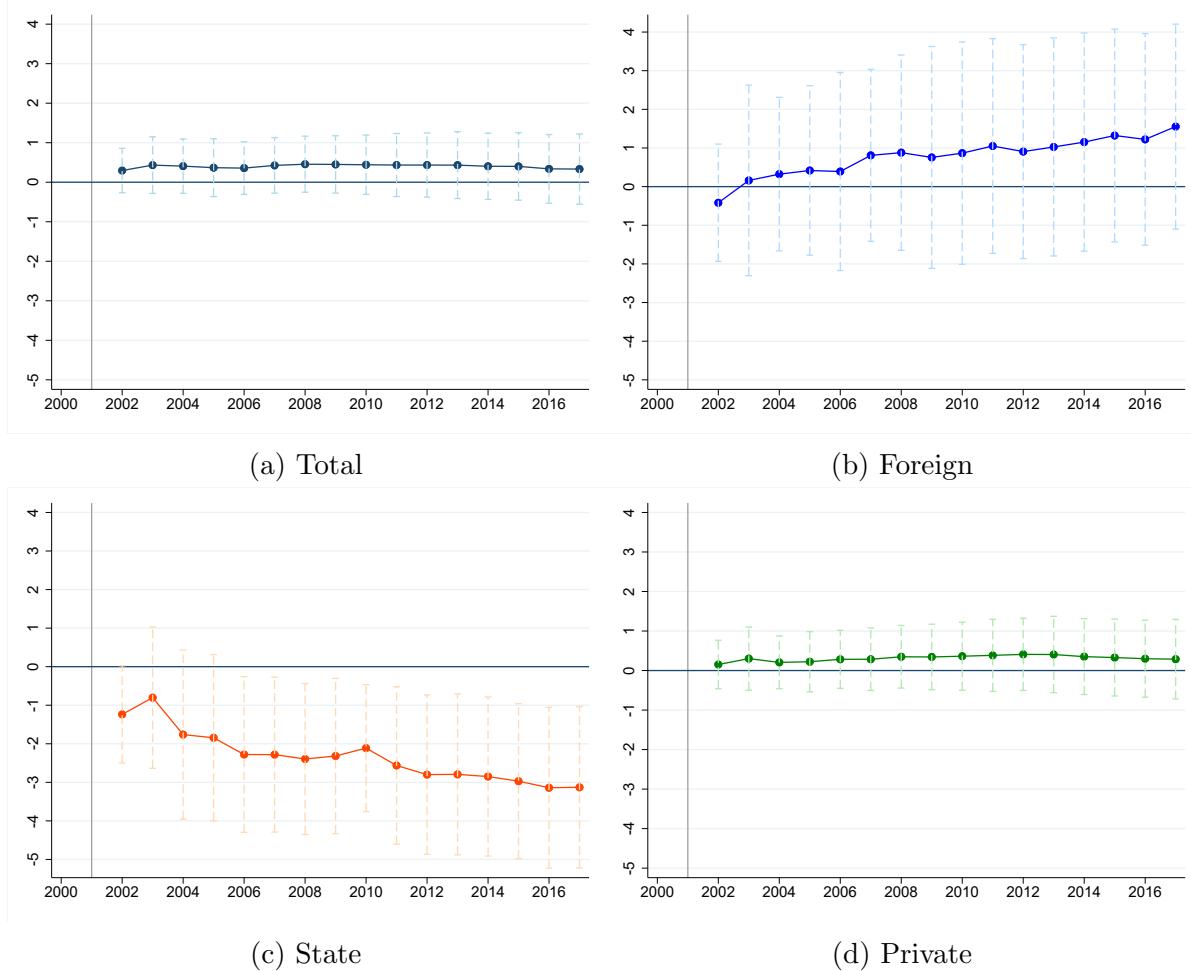


Figure D10: Exit by ownership and BTA tariffs, 2000-2017

*Notes:* We define the cumulative number of exiters as the difference between the number of firms in year 2000 and the number of those firms that have survived to year  $t$ . Each point reflects an individual regression coefficient from estimating equation (1) separately for all ownerships, foreign, state, and private in panels (a), (b), (c), and (d) respectively. The dependent variable is the  $\ln$  cumulative number of exiters. The BTA was implemented in 2001 and the base year is 2001 due to our definition of exit (indicated by the gray line). The analysis is conducted at the 4-digit industry level. Controls include 4-digit industry FEs, year FEs, the change in Vietnam's MFN tariffs due to WTO accession, Chinese exports to the U.S. in year  $t$ , and U.S. import quotas on textiles and clothing applied to Vietnam and China respectively. Dashed lines show 95 percent confidence intervals. Standard errors clustered at the 4-digit industry level. Weighted by year 2000 employment. Source: Vietnam GSO, USITC, World Bank WITS, and authors' calculations.